

Table 6.0-1. Indicator Contaminant Lists for External Loading Analyses.

Analyte	Upstream Surface Water Loading	Stormwater Loading	Atmospheric Deposition Loading	Upland Groundwater Plume Loading	Advective Loading from Sediment (Surface and Subsurface)
Metals					
Arsenic	X	X	X	X	X
Barium				X	
Cadmium				X	
Chromium	X	X	X		
Copper	X	X	X	X	X
Lead	X	X	X	X	X
Manganese				X	
Mercury	X	X	X	X	X
Nickel	X	X	X	X	
Zinc	X	X	X	X	
Butyltins					
Tributyltin ion	X		X		X
PCBs					
PCB077	X	X	X		X
PCB081	X	X	X		X
PCB105	X	X	X		X
PCB118 ^a	X	X	X		X
PCB126	X	X	X		X
PCB156 & PCB157 ^b	X	X	X		
PCB169	X	X	X		X
Total PCB Congeners	X				
Total PCBs ^c	X	X	X		X
PCB TEQ (ND=0) ^d	X	X	X		
PCDD/Fs					
Total PCDD/Fs	X		X		X
TCDD TEQ (ND=0) ^d	X		X		
DDx Pesticides					
4,4'-DDD	X	X	X	X	X
4,4'-DDT	X	X	X	X	X
Total DDE	X	X	X	X	X
Total DDD	X	X	X	X	X
Total DDT	X	X	X	X	X
Total DDx	X	X	X	X	X
Non-DDx Pesticides					
Total chlordanes ^c	X	X	X		X
γ-Hexachlorocyclohexane (Lindane)	X	X	X		X
Aldrin	X	X	X		X
Dieldrin	X	X	X		X
Polycyclic Aromatic Hydrocarbons					
Naphthalene	X	X	X	X	X
Benzo(a)pyrene	X	X	X	X	X
Total cPAHs ^f	X	X	X	X	X
Total cPAHs BaPEq ^g	X	X	X	X	X
Total HPAHs				X	
Total LPAHs				X	
Total PAHs	X	X	X	X	X

Table 6.0-1. Indicator Contaminant Lists for External Loading Analyses.

Analyte	Upstream Surface Water Loading	Stormwater Loading	Atmospheric Deposition Loading	Upland Groundwater Plume Loading	Advective Loading from Sediment (Surface and Subsurface)
Semivolatile Organic Compounds					
Bis(2-ethylhexyl)phthalate	X	X			X
1,2-Dichlorobenzene				X	
Pentachlorophenol	X ^h		X		
Hexachlorobenzene	X	X	X		
Volatile Organic Compounds					
1,2-Dichloroethane				X	
1,1,2-Trichloroethane				X	
1,2,4-Trimethylbenzene				X	
Benzene				X	
Carbon disulfide				X	
Chlorobenzene				X	
Chloroethane				X	
Chloroform				X	
cis-1,2-Dichloroethene				X	
Methylene Chloride				X	
Ethylbenzene				X	
Toluene				X	
Trichloroethene				X	
Vinyl Chloride				X	
Total Xylenes				X	
Petroleum					
Total Petroleum Hydrocarbons (Gasoline)					
Total Petroleum Hydrocarbons (Diesel)			X		
Total Petroleum Hydrocarbons (Residual)			X		
Total Petroleum Hydrocarbons			X		

Notes:

- ^a PCB118 includes PCB106 for co-eluted samples.
- ^b PCB156 & PCB157 summations were used in loading calculations for samples which were not co-eluted.
- ^c Total PCB loads were generated using PCB congener data; PCB Aroclor data were used where congener data were not available.
- ^d Toxic equivalency factors (TEFs) for dioxin-like compounds, mammalian WHO 2005 TEFs.
- ^e Total chlordanes includes the sum of: α -chlordane, γ -chlordane, oxychlordane, cis-nonachlor, trans-nonachlor.
- ^f Total cPAHs includes the sum of: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene.
- ^g cPAH BaPEq

Analyte	PEF	CAS
Benzo(a)anthracene	0.1	56-55-3
Benzo(a)pyrene	1	50-32-8
Benzo(b)fluoranthene	0.1	205-99-2
Benzo(k)fluoranthene	0.01	207-08-9
Chrysene	0.001	218-01-9
Dibenzo(a,h)anthracene	1	53-70-3
Indeno(1,2,3-cd)pyrene	0.1	193-39-5

^h Due to low detection frequency, pentachlorophenol loads were not calculated for surface water.

BaPEq - benzo(a)pyrene equivalent	PCDD/F - dioxin/furan
cPAH - carcinogenic polycyclic aromatic hydrocarbon	TEF - toxicity equivalency factor
DDx - 2,4'- and 4,4'-DDD, DDE, and DDT	TEQ - toxic equivalent concentration
PCB - polychlorinated biphenyl	WHO - World Health Organization

Table 6.1-1. Summary of Load Estimate Quantification Level and Calculation Approach.

Loading Term	Load Estimate Quantification Level ^a	Annual Study Area-Wide Loading Estimation Approach	Additional Loading Estimation Resolution (Spatial/Temporal)	Representation of Range in Load Estimates	Section 6 Discussion Subsection	Supporting Appendix E Subsection
Upstream Surface Water Loading	Quantitative to Semi-Quantitative	Observed Morrison Bridge flow records and observed transect surface water concentration data applied to generate transect-specific Study Area-wide annual mass loading rates.	<u>Spatial</u> - Loading estimated for all Study Area transects <u>Temporal</u> - Loading estimated for high-flow and low-flow portions of typical annual hydrograph	Range of results based on range of observed surface water transect concentrations (filtered and unfiltered) from all LWG sampling events. Flow rates not varied.	6.1.1.1	E-2
Bedload	Qualitative	Assessment based on physical site model and empirical evidence of grainsize trends.	n/a	n/a	6.1.1.2	n/a
Stormwater Loading	Quantitative	Observed and modeled concentrations and 50th percentile flow year.	<u>Spatial</u> - Loading estimated for model cells for east and west side of river	Range of results based on range of stormwater concentrations. Flow rates not varied.	6.1.2	E-3
Permitted Direct Discharges	Quantitative to Semi-Quantitative	Observed discharge flow and concentration for specific point dischargers applied to generate Study Area-wide annual mass loading rates.	<u>Spatial</u> - Loading estimated for individual discharge permits	Range of results based on observed discharge flows and concentrations (comparison of two years of records).	6.1.3	E-4
Atmospheric Deposition Loading	Semi-Quantitative	Observed local and literature atmospheric concentration records and literature deposition velocity estimates applied to generate Study Area-wide annual mass loading rate.	n/a	Range of results based on range of observed and literature values for concentrations.	6.1.4	E-5
Upland Groundwater Plume Loading	Quantitative	Observed groundwater discharge flow rates and transition zone water concentrations applied to generate Study Area-scale annual mass loading rates.	<u>Spatial</u> - Loading estimated for nine transition zone water study sites	Range of results based on range of observed groundwater discharge rates and on filtered and unfiltered concentrations measured at each transition zone water sample station.	6.1.5	E-6
Advective Loading through Sediment	Semi-Quantitative	Equilibrium partitioning-based estimates of pore water concentrations and Darcy's Law-estimated uniform groundwater discharge rates applied to generate Study Area-wide annual mass loading rates.	<u>Spatial</u> - Loading estimated by river mile	Range of results based on range of literature values for chemical partitioning (K_{oc} or K_d). Flow rates not varied.	6.1.6	E-6
Upland Soil and Riverbank Erosion	Qualitative	Due to the paucity of existing bank condition and chemistry information at multiple shoreline sites, it is not possible at this time to make semi-quantitative or quantitative estimates of loading from this source to the river.	n/a	n/a	6.1.7	E-7
Historical	Qualitative	Assessment based on limited available information for each loading term.	n/a	n/a	6.1.8	n/a

Notes:

^a The following definitions of qualitative, semi-quantitative, and quantitative assessments are applied to this discussion:

Qualitative – The attributes of the analysis are not measured/measurable. Discussions consider available information and examine general trends and relative effects.

Semi-quantitative – Some of the attributes of the analysis are measurable while others are not. General (or literature) non-Study-Area-specific data may be used in these assessments.

Quantitative – Most, if not all, of the attributes are measured and can be applied to the analysis. Some assumptions and modeling or calculation techniques may be used in these assessments.

n/a - Not applicable

Table 6.1-2. Surface Water Upstream (RM 11.8) Estimated Annual Loading Summary.

Analyte	Total Annual Upstream Loading ^a		
	Upper Loading Estimate (kg/yr)	Central Loading Estimate (kg/yr)	Lower Loading Estimate (kg/yr)
Metals			
Arsenic	14400	9490	4110
Chromium	33500	21100	11500
Copper	68100	46500	27200
Lead	15600	9380	4060
Mercury	875	232	0
Nickel	41300	26100	6280
Zinc	159000	92400	35400
Butyltins			
Tributyltin Ion	76.8	11	0
PCBs			
PCB077	0.01587	0.00931	0.00519
PCB081	0.000141	0.0000360	0
PCB105	0.0808	0.0525	0.0252
PCB118	0.213	0.135	0.0607
PCB126	0.000732	0.000275	0
PCB156 & PCB157	0.03037	0.0173	0.00596
PCB169	0.00041	0.0000721	0
Total PCB Congeners	7.39	4.71	2.94
PCB TEQ (ND=0)	0.0000847	0.0000376	0.0000035
PCDD/Fs			
Total PCDD/Fs	0.913	0.599	0.204
TCDD TEQ (ND=0)	0.00239	0.00145	0.000575
Pesticides			
4,4'-DDD	1.82	1.06	0.58
4,4'-DDT	5.12	3.25	1.04
Total DDE	3.37	2.5	0.83
Total DDD	2.29	1.33	0.763
Total DDT	5.49	3.7	1.31
Total DDx	10	7.53	3.01
Total chlordanes	1.62	1.22	0.686
γ-Hexachlorocyclohexane (Lindane)	0.771	0.577	0.286
Aldrin	0.0896	0.0664	0.0441
Dieldrin	5.97	3.49	1.5
PAHs			
Naphthalene	262	96.6	0
Benzo(a)pyrene	10.8	5.09	0
Total cPAHs	60.1	35.9	8.28
cPAH BaPEq	13.8	6.87	0.7
Total PAHs	662	380	159
SVOCs			
Bis(2-ethylhexyl)phthalate	16700	7540	0
Hexachlorobenzene	1.7	1.02	0.574

Notes:

^a Upstream loading estimates were generated based on the combined data sets from surface water sampling transects located at RM 11 and 16.

BaPEq - benzo(a)pyrene equivalent

cPAH - carcinogenic polycyclic aromatic hydrocarbon

DDx - 2,4'- and 4,4'-DDD, DDE, and DDT

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

PCDD/F - dioxin/furan

SVOC - semivolatile organic compound

TEQ - toxic equivalent concentration

Table 6.1-3. Summary of Modeled Fluxes of Water and Total Sediment Load in Portland Harbor for a Range of Flow Conditions.^a

Flow Regime/Year ^b	Total Sediment Load (Kg/yr)	Yearly Average Flow ^c (m ³ /s)
Total Sediment fluxes at RM 11.8		Flow Rate at RM 11.8
95th Percentile/1997	4.33E+09	1522.1
75th Percentile/1995	1.32E+09	1077.5
50th Percentile/1986	1.06E+09	877.9
25th Percentile/1981	8.29E+08	787.4
5th Percentile/2001	1.34E+08	453.5
Average	1.53E+09	943.7
Total Sediment fluxes at RM 1.2		Flow Rate at RM 1.2
95th Percentile/1997	-2.70E+09	-798.4
75th Percentile/1995	-8.16E+08	-615.7
50th Percentile/1986	-5.99E+08	-381.4
25th Percentile/1981	-4.43E+08	-307.1
5th Percentile/2001	-2.50E+07	-164.6
Average	-9.17E+08	-453.4
Total Sediment fluxes in MC		Flow Rate in MC
95th Percentile/1997	-9.48E+08	-723.9
75th Percentile/1995	-2.60E+08	-462.0
50th Percentile/1986	-2.65E+08	-496.3
25th Percentile/1981	-2.04E+08	-480.7
5th Percentile/2001	-1.96E+07	-288.9
Average	-3.40E+08	-490.4
Combined RM1.2 and MC Sediment fluxes		Combined RM 1.2 and MC Flow Rate
95th Percentile/1997	-3.65E+09	-1522.3
75th Percentile/1995	-1.08E+09	-1077.71
50th Percentile/1986	-8.64E+08	-877.7
25th Percentile/1981	-6.47E+08	-787.8
5th Percentile/2001	-4.45E+07	-453.5
Average	-1.26E+09	-943.8
Average Annual Mass (Flow) Remaining in Harbor	2.77E+08	-0.122
Percentage of Mass (Flow) Exiting to Mass Entering Harbor	81.9%	100.0%

Notes:

^a Positive loading values represent fluxes into the study area. Negative loading values represent fluxes out of the study area.

^b Flow regime was defined by the yearly average flow during USGS water year as follows.

5th Percentile (Flow Year 2001) – mean flow 454 cubic meters per second (m³/sec)

25th Percentile (Flow Year 1981) – mean flow 787 m³/sec

50th Percentile (Flow Year 1986) – mean flow 878 m³/sec

75th Percentile (Flow Year 1995) -- mean flow 1,078 m³/sec

95th Percentile (Flow Year 1997)– mean flow 1,522 m³/sec

^c Anchor QEA calculated yearly average flow rate at upstream of Willamette River, and based on the daily average flow rates recorded by USGS 14211720 Willamette River at Portland, OR.

Yearly flow and sediment loads were calculated based on USGS water year.

MC - Multnomah Channel

RM - river mile

USGS - U.S. Geological Survey

Table 6.1-4. Annual Total Estimated Stormwater Loads.

Analyte	Composite Water Study Area FT01-FT44				Sediment Study Area FT01-FT44			
	Basin Weighted Mean				Basin Weighted			
	Geomean Loading Estimate (kg/yr)	Loading Estimate (kg/yr)	Upper Loading Estimate (kg/yr)	Lower Loading Estimate (kg/yr)	Geomean Loading Estimate (kg/yr)	Mean Loading Estimate (kg/yr)	Upper Loading Estimate (kg/yr)	Lower Loading Estimate (kg/yr)
Metals								
Arsenic	1.08E+01	2.91E+01	4.98E+01	3.67E+00	4.20E+00	6.77E+00	1.61E+01	1.57E+00
Chromium	7.44E+01	8.30E+01	1.18E+02	5.43E+01	4.65E+01	4.19E+01	8.77E+01	3.75E+01
Copper	2.82E+02	3.73E+02	5.21E+02	1.68E+02	2.98E+02	3.10E+02	4.01E+02	2.77E+02
Lead	2.26E+02	3.24E+02	5.04E+02	1.42E+02	1.13E+02	1.17E+02	2.72E+02	7.10E+01
Mercury	4.40E-01	5.00E-01	7.75E-01	3.29E-01	9.34E-02	1.12E-01	1.49E-01	7.35E-02
Nickel	5.06E+01	6.19E+01	9.02E+01	3.09E+01	1.77E+01	1.62E+01	4.19E+01	1.03E+01
Zinc	2.18E+03	2.66E+03	3.63E+03	1.44E+03	4.80E+02	5.97E+02	7.61E+02	3.15E+02
PCBs								
PCB077	2.51E-03	4.08E-03	8.64E-03	1.76E-03	7.04E-04	8.97E-04	1.78E-03	4.62E-04
PCB081	1.08E-04	1.28E-04	2.19E-04	8.89E-05	9.45E-05	1.28E-04	2.21E-04	7.10E-05
PCB105	1.93E-02	2.91E-02	6.48E-02	1.43E-02	5.63E-03	7.28E-03	1.31E-02	4.18E-03
PCB118	4.52E-02	6.83E-02	1.40E-01	3.38E-02	1.16E-02	1.57E-02	3.03E-02	8.32E-03
PCB126	3.92E-04	5.74E-04	1.71E-03	2.35E-04	1.10E-04	1.28E-04	3.37E-04	7.49E-05
PCB156 & PCB157	7.63E-03	1.13E-02	2.52E-02	5.55E-03	1.92E-03	2.48E-03	5.05E-03	1.40E-03
PCB169	4.75E-05	5.42E-05	2.45E-04	3.14E-05	6.53E-06	6.69E-06	2.42E-05	3.93E-06
Total PCBs	1.36E+00	2.03E+00	4.07E+00	1.02E+00	3.37E-01	4.34E-01	7.59E-01	2.45E-01
PCB TEQ	2.91E-05	5.49E-05	1.67E-04	2.06E-05	8.22E-06	1.31E-05	3.52E-05	5.54E-06
Pesticides								
4,4'-DDD	4.07E-02	4.17E-02	4.70E-02	3.76E-02	3.37E-02	3.46E-02	4.30E-02	3.23E-02
4,4'-DDT	1.60E-01	1.66E-01	1.82E-01	1.47E-01	1.40E-01	1.44E-01	2.15E-01	1.29E-01
Total DDE	9.08E-02	9.34E-02	1.02E-01	8.64E-02	8.69E-02	8.73E-02	9.73E-02	8.44E-02
Total DDD	5.77E-02	6.39E-02	8.36E-02	5.05E-02	5.00E-02	5.00E-02	6.23E-02	4.68E-02
Total DDT	2.24E-01	2.38E-01	2.62E-01	2.09E-01	2.19E-01	2.29E-01	3.70E-01	2.04E-01
Total DDx	3.84E-01	3.95E-01	4.20E-01	3.59E-01	3.59E-01	3.66E-01	5.11E-01	3.38E-01
Total Chlordanes	3.85E-02	4.08E-02	5.64E-02	2.15E-02	8.50E-03	1.28E-02	1.66E-02	5.93E-03
γ-Hexachlorocyclohexane (Lindane)	1.16E-02	1.26E-02	2.09E-02	6.15E-03	1.57E-03	2.01E-03	6.22E-03	5.63E-04
Hexachlorobenzene	4.59E-03	1.12E-01	4.39E-01	2.91E-04	1.39E-03	1.53E-03	4.44E-03	5.54E-04
Aldrin	6.93E-03	6.90E-03	1.32E-02	3.89E-03	1.67E-03	2.18E-03	9.52E-03	1.03E-03
Dieldrin	1.23E-02	1.46E-02	2.18E-02	8.87E-03	7.61E-03	7.60E-03	1.06E-02	6.75E-03

Table 6.1-4. Annual Total Estimated Stormwater Loads.

Analyte	Composite Water Study Area FT01-FT44				Sediment Study Area FT01-FT44			
	Basin Weighted Mean				Basin Weighted			
	Geomean Loading Estimate (kg/yr)	Loading Estimate (kg/yr)	Upper Loading Estimate (kg/yr)	Lower Loading Estimate (kg/yr)	Geomean Loading Estimate (kg/yr)	Mean Loading Estimate (kg/yr)	Upper Loading Estimate (kg/yr)	Lower Loading Estimate (kg/yr)
PAHs								
Naphthalene	3.12E-01	5.71E-01	8.56E-01	1.37E-01	3.69E-02	1.42E-01	1.41E+00	1.80E-02
Benzo(a)pyrene	5.80E-01	7.53E-01	1.53E+00	3.86E-01	7.17E-01	8.66E-01	1.86E+00	4.90E-01
Total cPAHs BaPEq	9.47E-01	1.25E+00	2.50E+00	6.21E-01	1.06E+00	1.34E+00	2.86E+00	7.27E-01
Total PAHs	1.24E+01	1.51E+01	3.23E+01	6.52E+00	1.27E+01	1.52E+01	1.43E+02	5.82E+00
Phthalates								
Bis(2-ethylhexyl)phthalate	1.68E+01	2.08E+01	2.79E+01	1.10E+01	5.26E+00	5.30E+00	2.61E+01	2.63E+00

Notes:

The values presented in these tables represent calculations made for the 2009 Draft RI report and may not reflect final stormwater loading and fate and transport modeling methodologies.

- BaPEq - benzo(a)pyrene equivalent
- cPAH - carcinogenic polycyclic aromatic hydrocarbon
- DDx - 2,4'- and 4,4'-DDD, DDE, and DDT
- EPA - U.S. Environmental Protection Agency
- PAH - polycyclic aromatic hydrocarbon
- PCB - polychlorinated biphenyl
- TEQ - toxic equivalent concentration

Table 6.1-5a. Percentage of Stormwater Composite Water Loading by Land Use and Non-Representative Location.

Analyte	Representative Land Use Types						Non-Representative Outfalls											Total of Non-Representative Outfalls	
	Heavy Industrial	Light Industrial	Parks/Open Space	Residential/Commercial	Major Transportation	Total of Representative Land Uses	Basin L	Basin R	OF22B	WR107	WR123	WR14	WR142/145	WR147	WR161	WR22	WR384		WR96
Metals																			
Arsenic	63.73%	11.12%	3.35%	4.67%	5.09%	87.96%												12.04%	12.04%
Chromium	32.57%	10.76%	3.98%	4.49%	5.49%	57.30%		4.62%		0.20%						23.46%	14.42%		42.70%
Copper	49.61%	7.79%	1.07%	4.91%	6.93%	70.30%		1.91%				8.26%	2.95%	4.35%				12.22%	29.70%
Lead	37.57%	11.82%	0.62%	4.51%	3.66%	58.17%		7.91%	1.91%					1.57%				30.45%	41.83%
Mercury	29.44%	10.00%	5.89%	6.20%	1.64%	53.18%		1.66%	3.38%									36.49%	46.82%
Nickel	61.31%	8.96%	4.93%	5.25%	5.66%	86.11%		2.31%										11.58%	13.89%
Zinc	55.07%	8.71%	0.67%	3.72%	4.39%	72.56%		3.84%				13.15%		2.12%				8.33%	27.44%
PCBs																			
PCB077	30.12%	3.55%	0.18%	1.03%	1.62%	36.49%												63.51%	63.51%
PCB081	16.19%	5.42%	1.59%	8.47%	2.23%	33.90%												66.10%	66.10%
PCB105	26.70%	2.01%	0.10%	0.68%	0.95%	30.44%												69.56%	69.56%
PCB118	25.84%	2.02%	0.11%	0.69%	0.95%	29.61%												70.39%	70.39%
PCB126	42.32%	5.40%	1.29%	3.14%	1.30%	53.45%												46.55%	46.55%
PCB156 & 157	28.49%	2.00%	0.11%	0.69%	0.87%	32.16%												67.84%	67.84%
PCB169	56.87%	12.14%	6.09%	21.24%	3.66%	100.00%													0.00%
Total PCBs	25.45%	2.47%	0.04%	0.60%	1.03%	29.59%												70.41%	70.41%
PCB TEQ	28.31%	3.64%	0.00%	0.12%	1.44%	33.51%												66.49%	66.49%
Pesticides																			
4,4'-DDD	23.64%	0.35%	0.02%	0.53%	0.21%	24.75%			9.46%									65.79%	75.25%
4,4'-DDT	19.92%	0.21%	0.03%	1.46%	0.15%	21.78%												78.22%	78.22%
Total DDE	7.08%	0.44%	0.08%	0.91%	0.16%	8.66%			1.84%									89.51%	91.34%
Total DDD	20.71%	0.43%	0.01%	0.80%	0.15%	22.11%			6.78%									71.11%	77.89%
Total DDT	9.38%	0.16%	0.03%	1.15%	0.11%	10.83%			0.27%									88.90%	89.17%
Total DDx	13.11%	0.16%	0.04%	1.02%	0.04%	14.36%			1.43%									84.21%	85.64%
Total chlordanes	86.30%	2.04%	0.02%	1.48%	0.99%	90.83%			7.52%				1.66%						9.17%
γ-Hexachlorocyclohexane (Lindane)	95.53%	3.23%	0.02%	1.06%	0.16%	100.00%													0.00%
Hexachlorobenzene	86.88%	4.27%	0.05%	7.66%	1.13%	100.00%													0.00%
Aldrin	86.56%	2.20%	0.06%	0.76%	0.34%	89.92%			10.08%										10.08%
Dieldrin	44.99%	2.18%	0.06%	2.57%	0.70%	50.50%			49.50%										49.50%
PAHs																			
Naphthalene	58.14%	20.44%	5.55%	5.03%	10.85%	100.00%													0.00%
Benzo(a)pyrene	38.70%	12.95%	0.67%	2.52%	8.52%	63.36%	15.16%			1.67%		0.35%						19.45%	36.64%
Total cPAHs BaPEq	35.17%	13.18%	0.30%	2.20%	8.60%	59.46%	14.84%		1.56%		0.45%							23.70%	40.54%
Total PAHs	48.98%	12.72%	0.17%	2.12%	8.23%	72.21%	7.38%											20.40%	27.79%
Phthalates																			
Bis(2-ethylhexyl) phthalate	52.26%	23.09%	3.16%	17.28%	0.00%	95.79%	1.69%						2.53%						4.21%

Notes:

Percentages are based on the geomean of the site averaged loads in kilograms.

BaPEq - benzo(a)pyrene equivalent

cPAH - carcinogenic polycyclic aromatic hydrocarbon

DDx - 2,4'- and 4,4'-DDD, DDE, and DDT

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

TEQ - toxic equivalent concentration

Table 6.1-5b. Percentage of Stormwater Sediment Loading by Land Use and Non-Representative Location.

Analyte	Representative Land Use Types						Non-Representative Outfalls												Total of Non-Representative Outfalls
	Heavy Industrial	Light Industrial	Parks/Open Space	Residential/Commercial	Major Transportation	Total of Representative Land Uses	Basin L	Basin R	OF22B	WR107	WR123	WR14	WR142/145	WR147	WR161	WR22	WR384	WR96	
Metals																			
Arsenic	84.72%	6.20%	1.24%	4.36%	3.48%	100.00%													0.00%
Chromium	27.88%	20.19%	1.34%	3.97%	4.92%	58.30%				0.16%						37.09%	4.45%		41.70%
Copper	11.08%	1.51%	0.14%	1.08%	2.15%	15.96%									82.11%		1.93%		84.04%
Lead	44.27%	33.12%	0.27%	4.82%	4.27%	86.74%											13.26%		13.26%
Mercury	45.02%	10.24%	1.19%	6.62%	2.83%	65.90%											34.10%		34.10%
Nickel	70.56%	10.50%	1.78%	5.51%	8.09%	96.45%											3.55%		3.55%
Zinc	57.34%	6.68%	0.35%	4.49%	7.21%	76.07%									17.44%		6.49%		23.93%
PCBs																			
PCB077	38.54%	3.47%	0.03%	1.86%	3.24%	47.14%											52.86%		52.86%
PCB081	27.31%	2.20%	0.23%	1.06%	1.52%	32.31%											67.69%		67.69%
PCB105	29.88%	2.63%	0.07%	2.29%	1.79%	36.65%											63.35%		63.35%
PCB118	33.85%	2.83%	0.08%	2.70%	2.03%	41.48%											58.52%		58.52%
PCB126	47.62%	4.35%	0.16%	2.23%	2.58%	56.95%											43.05%		43.05%
PCB156 & 157	34.86%	2.59%	0.05%	2.14%	1.97%	41.60%											58.40%		58.40%
PCB169	72.77%	10.90%	8.11%	2.94%	5.28%	100.00%													0.00%
Total PCBs	33.65%	2.82%	0.04%	1.89%	2.29%	40.69%											59.31%		59.31%
PCB TEQ	30.33%	1.93%	0.00%	3.07%	3.54%	38.88%											61.12%		61.12%
Pesticides																			
4,4'-DDD	7.45%	0.43%	0.02%	0.64%	0.26%	8.79%				11.57%								79.64%	91.21%
4,4'-DDT	7.78%	0.24%	0.04%	1.68%	0.17%	9.91%												90.09%	90.09%
Total DDE	2.86%	0.46%	0.08%	0.95%	0.17%	4.51%												93.54%	95.49%
Total DDD	8.26%	0.50%	0.01%	0.92%	0.17%	9.87%												82.21%	90.13%
Total DDT	7.11%	0.17%	0.03%	1.18%	0.11%	8.59%												91.11%	91.41%
Total DDX	6.84%	0.17%	0.04%	1.09%	0.04%	8.17%												90.25%	91.83%
Total chlordanes	31.40%	9.23%	0.08%	6.72%	4.49%	51.92%								11.42%					48.08%
γ-Hexachlorocyclohexane (Lindane)	67.03%	23.82%	0.14%	7.82%	1.19%	100.00%													0.00%
Hexachlorobenzene	56.57%	14.15%	0.18%	25.35%	3.75%	100.00%													0.00%
Aldrin	42.15%	9.09%	0.25%	3.14%	1.42%	56.05%													43.95%
Dieldrin	10.34%	3.53%	0.09%	4.17%	1.14%	19.27%													80.73%
PAHs																			
Naphthalene	49.49%	20.07%	0.21%	4.37%	25.86%	100.00%													0.00%
Benzo(a)pyrene	32.19%	13.90%	0.14%	4.67%	4.11%	55.01%	26.83%			4.49%			0.57%				13.11%		44.99%
Total cPAHs BaPEq	27.89%	15.49%	0.12%	4.59%	3.80%	51.89%	26.73%			4.29%			0.69%				16.39%		48.11%
Total PAHs	57.42%	9.91%	0.08%	2.62%	3.84%	73.87%	13.48%										12.65%		26.13%
Phthalates																			
Bis(2-ethylhexyl) phthalate	49.79%	22.85%	0.01%	6.29%	15.67%	94.60%	5.40%												5.40%

Notes:

Percentage are based on the geomean of the site averaged loads in kilograms.

BaPEq - benzo(a)pyrene equivalent

cPAH - carcinogenic polycyclic aromatic hydrocarbon

DDx - 2,4'- and 4,4'-DDD, DDE, and DDT

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

TEQ - toxic equivalent concentration

Table 6.1-6. Direct Permitted Dischargers Estimated Annual Loading.^a

Analyte	Units	Study Area All Direct Discharges		
		RM 1.8 - 11.8		
		Upper	Central	Lower
Cyanide	kg/yr	0.0423	0.0423	0.0423
Arsenic (Pentavalent)	kg/yr	0.0550	0.0550	0.0550
Arsenic (Trivalent)	kg/yr	0.0633	0.0381	0.0129
Cadmium	kg/yr	0.420	0.420	0.420
Chromium (hexavalent)	kg/yr	0	0	0
Chromium (total)	kg/yr	0.513	0.465	0.417
Copper	kg/yr	96.6	64.5	32.4
Lead	kg/yr	123	78.9	34.8
Mercury	kg/yr	0.000275	0.000275	0.000275
Zinc	kg/yr	549	449	350
DDT	kg/yr	0	0	0
Benzo(a)pyrene	kg/yr	0.0532	0.0532	0.0532
Total PAHs	kg/yr	1.24	1.24	1.24
1,1,2-Trichloroethane	kg/yr	0	0	0
Benzene	kg/yr	3.19	3.19	3.19
Chloroethane	kg/yr	0	0	0
Chloroform	kg/yr	0	0	0
Trichloroethene	kg/yr	0	0	0
Vinyl Chloride	kg/yr	0	0	0
Total Petroleum Hydrocarbons	kg/yr	15.9	15.9	15.9

Notes:

^a The following NPDES-permitted sites were not included in this loading analysis:

- (1) Ash Grove, RM 2.8, NPDES OR0001601 IW-B16, OR-SIS 3690 (no discharge reported)
- (2) Columbia River Sand and Gravel (Linnton Sand Distribution), RM 4.7, NPDES OR0039896 IW-B16, OR-SIS 50872 (no chemical data reported)
- (3) Vigor Industrial LLC, RM 8.3, NPDES OR0022942 IW-B15, OR-DEQ 316 (no discharge reported)
- (4) Metropolitan Condomium Complex, RM 11.5, NPDES OR0038229 IW-B16, OR-SIS 92369 (no discharge reported)

NPDES - National Pollutant Discharge Elimination System

PAH - polycyclic aromatic hydrocarbon

RM - river mile

Table 6.1-7. Annual Load Estimates for Atmospheric Deposition to the Study Area River Surface.

Analyte	Total Deposition (kg/yr)		
	Lower	Central	Upper
Metals			
Arsenic	2.62E-02	7.32E+00	2.10E+02
Chromium	3.06E-02	6.10E+00	1.43E+02
Copper	1.06E-01	3.06E+01	5.59E+02
Lead	2.27E-01	1.69E+01	7.49E+02
Mercury	1.08E-01	2.89E+01	8.84E+01
Nickel	1.98E-02	8.79E+00	2.85E+02
Zinc	2.94E-01	7.88E+01	1.05E+03
PCBs			
Total PCBs	5.28E-01	6.25E-01	7.23E-01
PCB TEQ (ND=0)	2.77E-06	8.53E-06	1.43E-05
PCDD/Fs			
TCDD TEQ (ND=0)	1.66E-05	3.20E-05	4.57E-05
DDx Pesticides			
4,4'-DDE	8.73E-02	1.27E-01	1.65E-01
4,4'-DDT	2.91E-02	4.02E-02	4.85E-02
Total DDx ^a	6.79E-03	1.67E-01	2.13E-01
PAHs			
Naphthalene	2.08E-01	2.83E+00	3.21E+01
Benzo(a)pyrene	2.08E-01	8.10E-01	3.47E+00
Total cPAHs	--	3.65E+00	--
cPAH BaPEq ^b	--	8.10E-01	--
Total PAHs ^c	--	7.18E+00	1.17E+01
Petroleum			
Diesel-Range Hydrocarbons	2.87E+03	3.60E+03	4.34E+03
Semivolatile Organic Compounds			
Hexachlorobenzene	--	1.29E-01	--
Pesticides (non-DDx)			
Total Chlordanes	--	1.00E-02	--
Aldrin	--	3.19E-04	--
Dieldrin	--	2.63E-03	--

Notes:

^a Central and upper total DDx estimates calculated as the sum of the 4,4'-DDE and 4,4'-DDT loads.

^b The benzo(a)pyrene loading estimate is reported here due to the lack of site-specific dry deposition estimate for BaPEq.

^c Central estimates for total PAH atmospheric loads are based on the sum of the 13 site PAHs which were included in the NJADN data set, while the upper estimates are based on the sum all 36 PAHs included in the NJADN data set. The NJADN data set does not include the following individual PAHs generally used in summation of total PAHs for the LWG project: naphthalene, 2-methylnaphthalene, acenaphthene, and acenaphthylene.

-- Estimate not available

BaPEq - benzo(a)pyrene equivalent

cPAH - carcinogenic polycyclic aromatic hydrocarbon

DDx - 2,4'- and 4,4'-DDD, DDE, and DDT

LWG - Lower Willamette Group

NJADN - New Jersey Atmospheric Deposition Network

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

PCDD/F - dioxin/furan

TEQ - toxic equivalent concentration

Table 6.1-8. Estimated Upland Groundwater Plume Loading to the Water Column for the Study Area (kg/yr).

Analyte	Filtered ^a			Unfiltered ^b		
	Upper Loading Estimate	Central Loading Estimate	Lower Loading Estimate	Upper Loading Estimate	Central Loading Estimate	Lower Loading Estimate
Metals						
Arsenic	38.4	27.0	18.2	43.3	30.3	19.9
Barium	432	243	137	803	492	285
Cadmium	0.511	0.227	0.105	1.06	0.621	0.357
Copper	1.06	0.665	0.420	78.6	57.2	37.2
Lead	0.401	0.260	0.184	44.5	31.3	19.9
Manganese	12722	7962	4580	13775	8528	4759
Mercury	0.042	0.024	0.010	0.159	0.101	0.058
Nickel	16.3	10.0	5.8	52.0	34.3	20.0
Zinc	15.6	6.52	2.84	285	201	128
DDx Pesticides						
4,4'-DDD	6.80E-04	2.00E-04	1.51E-05	6.11E-02	1.89E-02	1.64E-03
4,4'-DDT	1.71E-05	1.71E-05	1.71E-05	9.28E-02	2.67E-02	1.48E-03
Total DDE	6.93E-06	6.93E-06	6.93E-06	9.49E-03	3.63E-03	4.27E-04
Total DDD	4.05E-02	2.05E-02	3.24E-03	1.39E-01	5.17E-02	6.14E-03
Total DDT	2.01E-03	1.05E-03	1.83E-04	9.87E-02	2.89E-02	1.73E-03
Total DDx	4.25E-02	2.16E-02	3.44E-03	2.47E-01	8.43E-02	8.31E-03
PAHs						
Naphthalene	192	125	57.3	1035	772	473
Benzo(a)pyrene	0.014	0.009	0.004	5.49	3.57	1.70
Total cPAHs	0.127	0.083	0.040	27.2	17.6	8.20
Total HPAHs	1.89	1.35	0.830	72.6	47.5	22.9
Total LPAHs	243	164	83.6	1160	863	528
Total PAHs	245	166	84.7	1234	911	551
cPAH BaPEq	0.020	0.013	0.0062	7.37	4.79	2.27
SVOCs						
1,2-Dichlorobenzene	n/a	n/a	n/a	67.5	35.5	6.45
VOCs						
1,2-Dichloroethane	n/a	n/a	n/a	4.02	1.25	0.153
1,1,2-Trichloroethane	n/a	n/a	n/a	1.88	0.588	0.076
1,2,4-Trimethylbenzene	n/a	n/a	n/a	6.49	4.48	2.43
Benzene	n/a	n/a	n/a	80.8	51.7	18.0
Carbon disulfide	n/a	n/a	n/a	1.38	0.691	0.686
Chlorobenzene	n/a	n/a	n/a	140	67.2	32.8
Chloroethane	n/a	n/a	n/a	1.73	1.70	1.68
Chloroform	n/a	n/a	n/a	2770	3.28	0.279
cis-1,2-Dichloroethene ^c	n/a	n/a	n/a	384	347	305
Methylene chloride	n/a	n/a	n/a	2679	821	86.4
Ethylbenzene	n/a	n/a	n/a	13.6	9.00	3.70
Toluene	n/a	n/a	n/a	5.70	3.74	2.03
Trichloroethene ^c	n/a	n/a	n/a	280	4.45	1.051
Vinyl chloride ^c	n/a	n/a	n/a	57.3	50.1	42.7
Total xylenes	n/a	n/a	n/a	15.6	9.63	2.95

Table 6.1-8. Estimated Upland Groundwater Plume Loading to the Water Column for the Study Area (kg/yr).

Analyte	Filtered^a			Unfiltered^b		
	Upper Loading Estimate	Central Loading Estimate	Lower Loading Estimate	Upper Loading Estimate	Central Loading Estimate	Lower Loading Estimate

Notes:

^a Filtered loads were calculated using analytical data collected with filtered Push Probe (Trident or GeoProbe) samplers and with peeper samplers. Due to sample volume limitations, filtered Push Probe samples were not collected at all sample locations. To calculate loading rate estimates at these sample locations, the average of the filtered push-probe contaminant concentrations within the same flow zone were used.

^b Unfiltered loads were calculated using analytical data collected with unfiltered Push Probe (Trident or GeoProbe) samplers and with peeper samplers.

^c Station GP-67 is located in Area 2 of the Siltronic site, which is understood to be an area impacted by a direct discharge of trichloroethene. Concentrations of trichloroethene and related degradation-chain chemicals (cis-1,2-Dichloroethene and vinyl chloride) measured at GP-67 are not representative of the upland groundwater plume; therefore, GP-67 was not included in loading calculations for these three contaminants for the Siltronic site or the entire Study Area. For comparison purposes, entire Study Area loads were also calculated for these three contaminants including station GP-67. These comparative loading results are as follows:

- cis-1,2-Dichloroethene - central: 3.47E+02 kg/yr, lower: 3.05E+02, upper: 3.84E+02
- Trichloroethene - central: 2.34E+02 kg/yr, lower: 1.88E+02, upper: 2.80E+02
- Vinyl chloride - central: 5.01E+01 kg/yr, lower: 4.27E+01, upper: 5.73E+01

DDx - 2,4'- and 4,4'-DDD, DDE, and DDT

n/a - Indicates that filtered data were not available. Per sampling protocols, filtered samples were not collected for VOCs or naphthalene.

BaPEq - benzo(a)pyrene equivalent

cPAH - carcinogenic polycyclic aromatic hydrocarbon

PAH - polycyclic aromatic hydrocarbon

SVOC - semivolatile organic compound

VOC - volatile organic compound

Table 6.1-9. Estimated Upland Groundwater Plume Loading to the Water Column, by Upland Site.

Analyte	Load Estimate	Units	ARCO		Arkema		ExxonMobil		Gasco		Gunderson	
			Peepers and Filtered	Peepers and Unfiltered								
			Push Probe ^a	Push Probe ^b								
Metals												
Arsenic	Central	kg/yr	5.04E-01	5.67E-01	3.40E-01	3.74E-01	6.48E-01	6.54E-01	1.11E+00	3.34E+00	3.08E-01	3.17E-01
Arsenic	Lower	kg/yr	4.41E-01	4.93E-01	5.32E-02	5.37E-02	3.27E-01	3.30E-01	3.26E-01	1.12E+00	2.10E-01	2.19E-01
Arsenic	Upper	kg/yr	7.58E-01	8.64E-01	1.09E+00	1.21E+00	1.09E+00	1.10E+00	1.88E+00	5.58E+00	9.46E-01	9.55E-01
Barium	Central	kg/yr	3.84E+00	7.87E+00	4.31E+01	5.08E+01	3.89E+00	6.20E+00	2.27E+01	1.06E+02	7.43E+00	8.57E+00
Barium	Lower	kg/yr	3.30E+00	7.07E+00	1.01E+01	1.06E+01	2.21E+00	3.12E+00	6.67E+00	3.91E+01	4.67E+00	5.80E+00
Barium	Upper	kg/yr	6.00E+00	1.11E+01	1.28E+02	1.54E+02	6.32E+00	1.05E+01	3.85E+01	1.78E+02	2.54E+01	2.65E+01
Cadmium	Central	kg/yr	2.92E-04	8.95E-03	9.40E-02	9.38E-02	1.75E-03	5.49E-03	1.81E-03	1.01E-01	6.73E-03	8.33E-03
Cadmium	Lower	kg/yr	2.30E-04	8.44E-03	9.86E-03	9.84E-03	9.62E-04	2.00E-03	5.41E-04	4.19E-02	4.09E-03	5.68E-03
Cadmium	Upper	kg/yr	5.38E-04	1.10E-02	3.07E-01	3.06E-01	2.88E-03	9.92E-03	3.07E-03	1.70E-01	2.40E-02	2.55E-02
Copper	Central	kg/yr	9.68E-03	1.14E+00	8.36E-02	8.36E-02	4.82E-03	2.98E-01	7.08E-02	1.79E+01	0.00E+00	1.97E-01
Copper	Lower	kg/yr	4.84E-03	1.04E+00	8.80E-03	8.80E-03	1.74E-03	7.50E-02	2.08E-02	6.82E+00	0.00E+00	1.97E-01
Copper	Upper	kg/yr	2.90E-02	1.52E+00	2.73E-01	2.73E-01	8.82E-03	5.74E-01	1.20E-01	3.00E+01	0.00E+00	1.97E-01
Lead	Central	kg/yr	3.01E-02	1.20E+00	1.28E-02	3.11E-01	8.23E-03	3.80E-01	4.41E-02	1.01E+01	0.00E+00	2.36E-01
Lead	Lower	kg/yr	1.51E-02	1.04E+00	1.20E-03	1.95E-02	2.18E-03	1.22E-01	1.29E-02	3.87E+00	0.00E+00	2.36E-01
Lead	Upper	kg/yr	9.03E-02	1.84E+00	4.25E-02	1.07E+00	1.58E-02	7.07E-01	7.46E-02	1.70E+01	0.00E+00	2.36E-01
Manganese	Central	kg/yr	1.31E+02	1.48E+02	4.35E+02	4.54E+02	1.43E+02	1.51E+02	8.78E+02	1.31E+03	1.58E+02	1.67E+02
Manganese	Lower	kg/yr	1.17E+02	1.29E+02	1.04E+02	1.04E+02	6.92E+01	7.43E+01	2.59E+02	4.17E+02	1.03E+02	1.12E+02
Manganese	Upper	kg/yr	1.88E+02	2.24E+02	1.28E+03	1.36E+03	2.42E+02	2.56E+02	1.49E+03	2.22E+03	5.12E+02	5.21E+02
Mercury	Central	kg/yr	0.00E+00	1.15E-03	3.31E-03	6.44E-03	0.00E+00	7.04E-04	1.42E-02	3.71E-02	0.00E+00	0.00E+00
Mercury	Lower	kg/yr	0.00E+00	1.03E-03	2.14E-04	3.88E-04	0.00E+00	1.17E-04	4.12E-03	1.68E-02	0.00E+00	0.00E+00
Mercury	Upper	kg/yr	0.00E+00	1.62E-03	1.14E-02	2.22E-02	0.00E+00	1.41E-03	2.39E-02	6.31E-02	0.00E+00	0.00E+00
Nickel	Central	kg/yr	1.44E-01	5.57E-01	1.04E+00	1.22E+00	1.25E-01	2.40E-01	1.25E+00	1.17E+01	1.57E-01	2.41E-01
Nickel	Lower	kg/yr	1.25E-01	5.19E-01	1.65E-01	1.73E-01	6.39E-02	8.85E-02	3.64E-01	4.33E+00	1.08E-01	1.92E-01
Nickel	Upper	kg/yr	2.22E-01	7.08E-01	3.28E+00	3.94E+00	2.12E-01	4.37E-01	2.11E+00	1.96E+01	4.80E-01	5.64E-01
Zinc	Central	kg/yr	1.56E+00	3.89E+00	1.74E+00	2.03E+00	2.15E-01	1.13E+00	1.19E+00	6.82E+01	2.12E-01	1.39E+00
Zinc	Lower	kg/yr	8.57E-01	3.03E+00	2.21E-01	2.44E-01	1.12E-01	3.08E-01	3.54E-01	2.73E+01	1.18E-01	1.30E+00
Zinc	Upper	kg/yr	4.36E+00	7.32E+00	5.60E+00	6.57E+00	3.61E-01	2.16E+00	2.02E+00	1.15E+02	8.24E-01	2.00E+00
Pesticides												
4,4'-DDD	Central	kg/yr	--	--	2.00E-04	1.70E-02	--	--	--	--	--	--
4,4'-DDD	Lower	kg/yr	--	--	1.51E-05	1.32E-03	--	--	--	--	--	--
4,4'-DDD	Upper	kg/yr	--	--	6.80E-04	5.73E-02	--	--	--	--	--	--
4,4'-DDT	Central	kg/yr	--	--	1.71E-05	2.67E-02	--	--	--	--	--	--
4,4'-DDT	Lower	kg/yr	--	--	1.71E-05	1.48E-03	--	--	--	--	--	--
4,4'-DDT	Upper	kg/yr	--	--	1.71E-05	9.28E-02	--	--	--	--	--	--
Total DDE	Central	kg/yr	--	--	6.93E-06	1.65E-03	--	--	--	--	--	--
Total DDE	Lower	kg/yr	--	--	6.93E-06	1.07E-04	--	--	--	--	--	--
Total DDE	Upper	kg/yr	--	--	6.93E-06	5.67E-03	--	--	--	--	--	--
Total DDD	Central	kg/yr	--	--	6.43E-04	2.73E-02	--	--	--	--	--	--
Total DDD	Lower	kg/yr	--	--	4.16E-05	2.20E-03	--	--	--	--	--	--
Total DDD	Upper	kg/yr	--	--	2.21E-03	9.19E-02	--	--	--	--	--	--
Total DDT	Central	kg/yr	--	--	1.71E-05	2.77E-02	--	--	--	--	--	--
Total DDT	Lower	kg/yr	--	--	1.71E-05	1.52E-03	--	--	--	--	--	--
Total DDT	Upper	kg/yr	--	--	1.71E-05	9.62E-02	--	--	--	--	--	--
Total DDx	Central	kg/yr	--	--	6.67E-04	5.66E-02	--	--	--	--	--	--
Total DDx	Lower	kg/yr	--	--	6.56E-05	3.83E-03	--	--	--	--	--	--
Total DDx	Upper	kg/yr	--	--	2.23E-03	1.94E-01	--	--	--	--	--	--
PAHs												
Naphthalene	Central	kg/yr	3.14E-03	8.59E-03	1.45E-01	1.45E-01	1.56E-03	5.70E-03	9.05E+01	2.18E+02	--	--
Naphthalene	Lower	kg/yr	2.99E-03	7.95E-03	7.46E-03	7.45E-03	9.21E-04	2.99E-03	2.68E+01	2.22E+01	--	--
Naphthalene	Upper	kg/yr	3.77E-03	1.12E-02	5.07E-01	5.07E-01	2.54E-03	9.60E-03	1.53E+02	3.91E+02	--	--
Benzo(a)pyrene	Central	kg/yr	1.48E-05	1.20E-03	--	--	0.00E+00	3.42E-03	6.75E-03	2.65E+00	--	--
Benzo(a)pyrene	Lower	kg/yr	7.42E-06	1.11E-03	--	--	0.00E+00	1.82E-03	2.04E-03	9.43E-01	--	--
Benzo(a)pyrene	Upper	kg/yr	4.45E-05	1.57E-03	--	--	0.00E+00	5.54E-03	1.15E-02	4.42E+00	--	--
Total cPAHs	Central	kg/yr	1.57E-04	4.22E-03	--	--	1.16E-03	1.91E-02	5.69E-02	1.33E+01	--	--
Total cPAHs	Lower	kg/yr	7.84E-05	3.64E-03	--	--	7.12E-04	1.00E-02	1.71E-02	4.76E+00	--	--
Total cPAHs	Upper	kg/yr	4.70E-04	6.55E-03	--	--	1.84E-03	3.11E-02	9.66E-02	2.23E+01	--	--

Table 6.1-9. Estimated Upland Groundwater Plume Loading to the Water Column, by Upland Site.

Analyte	Load Estimate	Units	ARCO		Arkema		ExxonMobil		Gasco		Gunderson	
			Peepers and Filtered	Peepers and Unfiltered								
			Push Probe ^a	Push Probe ^b								
cPAH BaPEq	Central	kg/yr	2.26E-05	1.71E-03	--	--	6.14E-05	4.50E-03	9.31E-03	3.56E+00	--	--
cPAH BaPEq	Lower	kg/yr	1.13E-05	1.57E-03	--	--	3.76E-05	2.39E-03	2.81E-03	1.27E+00	--	--
cPAH BaPEq	Upper	kg/yr	6.78E-05	2.30E-03	--	--	9.77E-05	7.30E-03	1.58E-02	5.94E+00	--	--
Total HPAHs	Central	kg/yr	7.79E-03	2.37E-02	--	--	1.99E-02	1.19E-01	6.26E-01	3.38E+01	--	--
Total HPAHs	Lower	kg/yr	4.38E-03	2.01E-02	--	--	1.37E-02	7.58E-02	1.89E-01	1.16E+01	--	--
Total HPAHs	Upper	kg/yr	2.14E-02	3.84E-02	--	--	2.90E-02	1.79E-01	1.06E+00	5.68E+01	--	--
Total LPAHs	Central	kg/yr	6.28E-02	8.79E-02	--	--	2.68E-01	5.41E-01	1.05E+02	2.56E+02	--	--
Total LPAHs	Lower	kg/yr	4.27E-02	6.75E-02	--	--	1.76E-01	3.65E-01	3.10E+01	3.05E+01	--	--
Total LPAHs	Upper	kg/yr	1.43E-01	1.69E-01	--	--	4.04E-01	8.11E-01	1.77E+02	4.56E+02	--	--
Total PAHs	Central	kg/yr	7.06E-02	1.11E-01	--	--	2.88E-01	6.61E-01	1.06E+02	2.90E+02	--	--
Total PAHs	Lower	kg/yr	4.71E-02	8.75E-02	--	--	1.90E-01	4.41E-01	3.13E+01	4.22E+01	--	--
Total PAHs	Upper	kg/yr	1.65E-01	2.07E-01	--	--	4.34E-01	9.91E-01	1.79E+02	5.13E+02	--	--
SVOCs												
1,2-Dichlorobenzene	Central	kg/yr	n/a	1.79E-03	n/a	1.96E-03	n/a	0.00E+00	n/a	2.06E-02	n/a	0.00E+00
1,2-Dichlorobenzene	Lower	kg/yr	n/a	8.96E-04	n/a	1.33E-04	n/a	0.00E+00	n/a	7.26E-03	n/a	0.00E+00
1,2-Dichlorobenzene	Upper	kg/yr	n/a	5.38E-03	n/a	6.73E-03	n/a	0.00E+00	n/a	3.39E-02	n/a	0.00E+00
VOCs												
1,2-Dichloroethane	Central	kg/yr	n/a	5.48E-04	n/a	1.22E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	2.37E-02
1,2-Dichloroethane	Lower	kg/yr	n/a	2.74E-04	n/a	1.29E-01	n/a	0.00E+00	n/a	0.00E+00	n/a	2.37E-02
1,2-Dichloroethane	Upper	kg/yr	n/a	1.64E-03	n/a	3.99E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	2.37E-02
1,1,2-Trichloroethane	Central	kg/yr	n/a	0.00E+00	n/a	5.68E-01	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00
1,1,2-Trichloroethane	Lower	kg/yr	n/a	0.00E+00	n/a	5.98E-02	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00
1,1,2-Trichloroethane	Upper	kg/yr	n/a	0.00E+00	n/a	1.85E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00
1,2,4-Trimethylbenzene	Central	kg/yr	n/a	--	n/a	--	n/a	--	n/a	2.72E+00	n/a	--
1,2,4-Trimethylbenzene	Lower	kg/yr	n/a	--	n/a	--	n/a	--	n/a	9.60E-01	n/a	--
1,2,4-Trimethylbenzene	Upper	kg/yr	n/a	--	n/a	--	n/a	--	n/a	4.48E+00	n/a	--
Benzene	Central	kg/yr	n/a	0.00E+00	n/a	3.62E+00	n/a	0.00E+00	n/a	3.27E+01	n/a	2.64E-03
Benzene	Lower	kg/yr	n/a	0.00E+00	n/a	3.54E+00	n/a	0.00E+00	n/a	1.82E+00	n/a	2.64E-03
Benzene	Upper	kg/yr	n/a	0.00E+00	n/a	3.82E+00	n/a	0.00E+00	n/a	5.92E+01	n/a	2.64E-03
Carbon disulfide	Central	kg/yr	n/a	0.00E+00	n/a	3.60E-03	n/a	0.00E+00	n/a	6.79E-01	n/a	0.00E+00
Carbon disulfide	Lower	kg/yr	n/a	0.00E+00	n/a	5.79E-04	n/a	0.00E+00	n/a	6.79E-01	n/a	0.00E+00
Carbon disulfide	Upper	kg/yr	n/a	0.00E+00	n/a	1.14E-02	n/a	0.00E+00	n/a	1.36E+00	n/a	0.00E+00
Chlorobenzene	Central	kg/yr	n/a	0.00E+00	n/a	5.35E+01	n/a	0.00E+00	n/a	8.04E-02	n/a	4.80E-03
Chlorobenzene	Lower	kg/yr	n/a	0.00E+00	n/a	2.93E+01	n/a	0.00E+00	n/a	2.33E-02	n/a	4.80E-03
Chlorobenzene	Upper	kg/yr	n/a	0.00E+00	n/a	1.15E+02	n/a	0.00E+00	n/a	1.35E-01	n/a	4.80E-03
Chloroethane	Central	kg/yr	n/a	0.00E+00	n/a	6.84E-03	n/a	0.00E+00	n/a	0.00E+00	n/a	1.63E+00
Chloroethane	Lower	kg/yr	n/a	0.00E+00	n/a	7.20E-04	n/a	0.00E+00	n/a	0.00E+00	n/a	1.63E+00
Chloroethane	Upper	kg/yr	n/a	0.00E+00	n/a	2.23E-02	n/a	0.00E+00	n/a	0.00E+00	n/a	1.63E+00
Chloroform	Central	kg/yr	n/a	0.00E+00	n/a	3.28E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00
Chloroform	Lower	kg/yr	n/a	0.00E+00	n/a	2.79E-01	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00
Chloroform	Upper	kg/yr	n/a	0.00E+00	n/a	2.77E+03	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00
cis-1,2-Dichloroethene c	Central	kg/yr	n/a	0.00E+00	n/a	8.79E-02	n/a	2.40E-03	n/a	2.75E-02	n/a	3.33E-03
cis-1,2-Dichloroethene c	Lower	kg/yr	n/a	0.00E+00	n/a	8.37E-03	n/a	4.00E-04	n/a	9.72E-03	n/a	3.33E-03
cis-1,2-Dichloroethene c	Upper	kg/yr	n/a	0.00E+00	n/a	2.91E-01	n/a	4.80E-03	n/a	4.54E-02	n/a	3.33E-03
Methylene Chloride	Central	kg/yr	n/a	0.00E+00	n/a	8.21E+02	n/a	0.00E+00	n/a	4.69E-04	n/a	0.00E+00
Methylene Chloride	Lower	kg/yr	n/a	0.00E+00	n/a	8.64E+01	n/a	0.00E+00	n/a	4.69E-04	n/a	0.00E+00
Methylene Chloride	Upper	kg/yr	n/a	0.00E+00	n/a	2.68E+03	n/a	0.00E+00	n/a	9.37E-04	n/a	0.00E+00
Ethylbenzene	Central	kg/yr	n/a	0.00E+00	n/a	2.37E-02	n/a	0.00E+00	n/a	4.94E+00	n/a	8.81E-03
Ethylbenzene	Lower	kg/yr	n/a	0.00E+00	n/a	1.59E-03	n/a	0.00E+00	n/a	3.78E-01	n/a	8.81E-03
Ethylbenzene	Upper	kg/yr	n/a	0.00E+00	n/a	8.15E-02	n/a	0.00E+00	n/a	8.91E+00	n/a	8.81E-03
Toluene	Central	kg/yr	n/a	6.21E-03	n/a	1.97E-01	n/a	8.96E-03	n/a	1.66E+00	n/a	2.29E-02
Toluene	Lower	kg/yr	n/a	3.10E-03	n/a	1.81E-02	n/a	5.33E-03	n/a	4.29E-01	n/a	2.05E-02
Toluene	Upper	kg/yr	n/a	1.86E-02	n/a	6.56E-01	n/a	1.43E-02	n/a	2.86E+00	n/a	3.82E-02
Trichloroethene ^c	Central	kg/yr	n/a	5.73E-04	n/a	3.71E+00	n/a	0.00E+00	n/a	2.70E-03	n/a	0.00E+00
Trichloroethene ^c	Lower	kg/yr	n/a	2.87E-04	n/a	3.90E-01	n/a	0.00E+00	n/a	9.53E-04	n/a	0.00E+00
Trichloroethene ^c	Upper	kg/yr	n/a	1.72E-03	n/a	1.21E+01	n/a	0.00E+00	n/a	4.45E-03	n/a	0.00E+00

Table 6.1-9. Estimated Upland Groundwater Plume Loading to the Water Column, by Upland Site.

Analyte	Load Estimate	Units	ARCO		Arkema		ExxonMobil		Gasco		Gunderson	
			Peepers and Filtered	Peepers and Unfiltered								
			Push Probe ^a	Push Probe ^b								
Vinyl chloride ^c	Central	kg/yr	n/a	0.00E+00	n/a	4.48E-01	n/a	0.00E+00	n/a	6.27E-03	n/a	2.59E-02
Vinyl chloride ^c	Lower	kg/yr	n/a	0.00E+00	n/a	4.67E-02	n/a	0.00E+00	n/a	2.21E-03	n/a	2.57E-02
Vinyl chloride ^c	Upper	kg/yr	n/a	0.00E+00	n/a	1.46E+00	n/a	0.00E+00	n/a	1.03E-02	n/a	2.71E-02
Total Xylenes	Central	kg/yr	n/a	3.01E-03	n/a	1.22E-01	n/a	3.04E-03	n/a	6.39E+00	n/a	2.95E-02
Total Xylenes	Lower	kg/yr	n/a	1.51E-03	n/a	7.65E-03	n/a	1.20E-03	n/a	3.69E-01	n/a	2.95E-02
Total Xylenes	Upper	kg/yr	n/a	9.04E-03	n/a	4.20E-01	n/a	5.46E-03	n/a	1.16E+01	n/a	2.95E-02

Table 6.1-9. Estimated Upland Groundwater Plume Loading to the Water Column, by Upland Site.

Analyte	Load Estimate	Units	Kinder Morgan		Rhone Poulenc		Siltronic		Willbridge		Entire Study Area	
			Peepers and Filtered	Peepers and Unfiltered								
			Push Probe ^a	Push Probe ^b								
Metals												
Arsenic	Central	kg/yr	1.27E-01	1.26E-01	3.23E+00	3.63E+00	3.14E+00	3.78E+00	1.76E+01	1.75E+01	2.70E+01	3.03E+01
Arsenic	Lower	kg/yr	1.16E-01	1.16E-01	1.36E+00	1.60E+00	2.69E+00	3.43E+00	1.27E+01	1.26E+01	1.82E+01	1.99E+01
Arsenic	Upper	kg/yr	2.38E-01	2.38E-01	5.69E+00	6.30E+00	3.55E+00	4.10E+00	2.31E+01	2.29E+01	3.84E+01	4.33E+01
Barium	Central	kg/yr	8.06E-01	9.53E-01	7.24E+01	1.02E+02	3.71E+01	1.38E+02	5.18E+01	7.22E+01	2.43E+02	4.92E+02
Barium	Lower	kg/yr	6.75E-01	8.22E-01	3.81E+01	5.08E+01	3.25E+01	1.15E+02	3.86E+01	5.24E+01	1.37E+02	2.85E+02
Barium	Upper	kg/yr	2.21E+00	2.36E+00	1.17E+02	1.65E+02	4.14E+01	1.57E+02	6.81E+01	9.76E+01	4.32E+02	8.03E+02
Cadmium	Central	kg/yr	2.08E-03	3.12E-03	8.59E-02	1.46E-01	9.49E-03	2.09E-01	2.54E-02	4.56E-02	2.27E-01	6.21E-01
Cadmium	Lower	kg/yr	1.37E-03	2.42E-03	6.16E-02	8.29E-02	8.76E-03	1.73E-01	1.74E-02	3.11E-02	1.05E-01	3.57E-01
Cadmium	Upper	kg/yr	9.60E-03	1.06E-02	1.21E-01	2.23E-01	1.02E-02	2.40E-01	3.36E-02	6.17E-02	5.11E-01	1.06E+00
Copper	Central	kg/yr	1.36E-03	1.90E-02	4.09E-01	5.82E+00	2.67E-02	2.82E+01	5.96E-02	3.54E+00	6.65E-01	5.72E+01
Copper	Lower	kg/yr	1.36E-03	1.90E-02	3.18E-01	3.53E+00	2.37E-02	2.31E+01	4.04E-02	2.41E+00	4.20E-01	3.72E+01
Copper	Upper	kg/yr	1.36E-03	1.90E-02	5.11E-01	8.36E+00	2.94E-02	3.27E+01	8.56E-02	4.97E+00	1.06E+00	7.86E+01
Lead	Central	kg/yr	5.30E-04	1.81E-02	1.36E-01	4.49E+00	1.65E-02	1.36E+01	1.21E-02	1.06E+00	2.60E-01	3.13E+01
Lead	Lower	kg/yr	5.30E-04	1.81E-02	1.30E-01	2.77E+00	1.46E-02	1.11E+01	8.23E-03	7.17E-01	1.84E-01	1.99E+01
Lead	Upper	kg/yr	5.30E-04	1.81E-02	1.42E-01	6.39E+00	1.57E-02	1.57E+01	1.67E-02	1.51E+00	4.01E-01	4.45E+01
Manganese	Central	kg/yr	6.40E+01	7.17E+01	1.80E+03	1.97E+03	1.76E+03	1.62E+03	2.59E+03	2.63E+03	7.96E+03	8.53E+03
Manganese	Lower	kg/yr	5.86E+01	6.63E+01	4.40E+02	5.11E+02	1.50E+03	1.39E+03	1.93E+03	1.95E+03	4.58E+03	4.76E+03
Manganese	Upper	kg/yr	1.22E+02	1.29E+02	3.49E+03	3.77E+03	1.99E+03	1.84E+03	3.41E+03	3.47E+03	1.27E+04	1.38E+04
Mercury	Central	kg/yr	0.00E+00	0.00E+00	0.00E+00	7.75E-03	6.31E-03	4.78E-02	0.00E+00	0.00E+00	2.38E-02	1.01E-01
Mercury	Lower	kg/yr	0.00E+00	0.00E+00	0.00E+00	1.25E-03	5.49E-03	0.00E-02	3.89E-02	0.00E+00	9.82E-03	5.85E-02
Mercury	Upper	kg/yr	0.00E+00	0.00E+00	0.00E+00	1.49E-02	7.03E-03	5.56E-02	0.00E+00	0.00E+00	4.23E-02	1.59E-01
Nickel	Central	kg/yr	2.47E-02	3.39E-02	2.31E+00	4.62E+00	1.11E+00	1.07E+01	3.81E+00	5.01E+00	9.97E+00	3.43E+01
Nickel	Lower	kg/yr	1.76E-02	2.68E-02	1.24E+00	2.26E+00	9.66E+01	8.82E+00	2.76E+00	3.57E+00	5.81E+00	2.00E+01
Nickel	Upper	kg/yr	1.00E-01	1.09E-01	3.69E+00	7.46E+00	1.24E+00	1.24E+01	5.01E+00	6.80E+00	1.63E+01	5.20E+01
Zinc	Central	kg/yr	1.16E-01	1.12E-01	0.00E+00	1.43E+01	4.48E-01	1.03E+02	1.04E+00	6.79E+00	6.52E+00	2.01E+02
Zinc	Lower	kg/yr	7.37E-02	7.01E-02	0.00E+00	6.80E+00	3.98E-01	8.47E+01	7.12E-01	4.60E+00	2.84E+00	1.28E+02
Zinc	Upper	kg/yr	5.64E-01	5.61E-01	0.00E+00	2.26E+01	4.92E-01	1.20E+02	1.40E+00	9.62E+00	1.56E+01	2.85E+02
Pesticides												
4,4'-DDD	Central	kg/yr	--	--	0.00E+00	1.98E-03	--	--	--	--	2.00E-04	1.89E-02
4,4'-DDD	Lower	kg/yr	--	--	0.00E+00	3.20E-04	--	--	--	--	1.51E-05	1.64E-03
4,4'-DDD	Upper	kg/yr	--	--	0.00E+00	3.83E-03	--	--	--	--	6.80E-04	6.11E-02
4,4'-DDT	Central	kg/yr	--	--	0.00E+00	0.00E+00	--	--	--	--	1.71E-05	2.67E-02
4,4'-DDT	Lower	kg/yr	--	--	0.00E+00	0.00E+00	--	--	--	--	1.71E-05	1.48E-03
4,4'-DDT	Upper	kg/yr	--	--	0.00E+00	0.00E+00	--	--	--	--	1.71E-05	9.28E-02
Total DDE	Central	kg/yr	--	--	0.00E+00	1.98E-03	--	--	--	--	6.93E-06	3.63E-03
Total DDE	Lower	kg/yr	--	--	0.00E+00	3.20E-04	--	--	--	--	6.93E-06	4.27E-04
Total DDE	Upper	kg/yr	--	--	0.00E+00	3.83E-03	--	--	--	--	6.93E-06	9.49E-03
Total DDD	Central	kg/yr	--	--	1.98E-02	2.45E-02	--	--	--	--	2.05E-02	5.17E-02
Total DDD	Lower	kg/yr	--	--	3.20E-03	3.95E-03	--	--	--	--	3.24E-03	6.14E-03
Total DDD	Upper	kg/yr	--	--	3.83E-02	4.72E-02	--	--	--	--	4.05E-02	1.39E-01
Total DDT	Central	kg/yr	--	--	1.03E-03	1.30E-03	--	--	--	--	1.05E-03	2.89E-02
Total DDT	Lower	kg/yr	--	--	1.66E-04	2.09E-04	--	--	--	--	1.83E-04	1.73E-03
Total DDT	Upper	kg/yr	--	--	1.99E-03	2.50E-03	--	--	--	--	2.01E-03	9.87E-02
Total DDx	Central	kg/yr	--	--	2.09E-02	2.78E-02	--	--	--	--	2.16E-02	8.43E-02
Total DDx	Lower	kg/yr	--	--	3.37E-03	4.48E-03	--	--	--	--	3.44E-03	8.31E-03
Total DDx	Upper	kg/yr	--	--	4.03E-02	5.36E-02	--	--	--	--	4.25E-02	2.47E-01
PAHs												
Naphthalene	Central	kg/yr	0.00E+00	0.00E+00	1.03E-01	1.03E-01	3.42E+01	5.53E+02	1.60E-02	1.60E-02	1.25E+02	7.72E+02
Naphthalene	Lower	kg/yr	0.00E+00	0.00E+00	7.05E-02	7.05E-02	3.04E+01	4.50E+02	1.29E-02	1.29E-02	5.73E+01	4.73E+02
Naphthalene	Upper	kg/yr	0.00E+00	0.00E+00	1.40E-01	1.40E-01	3.76E+01	6.43E+02	2.17E-02	2.17E-02	1.92E+02	1.03E+03
Benzo(a)pyrene	Central	kg/yr	0.00E+00	0.00E+00	--	--	2.60E-03	9.18E-01	0.00E+00	0.00E+00	9.36E-03	3.57E+00
Benzo(a)pyrene	Lower	kg/yr	0.00E+00	0.00E+00	--	--	2.30E-03	7.50E-01	0.00E+00	0.00E+00	4.34E-03	1.70E+00
Benzo(a)pyrene	Upper	kg/yr	0.00E+00	0.00E+00	--	--	2.86E-03	1.07E+00	0.00E+00	0.00E+00	1.44E-02	5.49E+00
Total cPAHs	Central	kg/yr	1.19E-05	6.56E-04	--	--	2.51E-02	4.20E+00	0.00E+00	0.00E+00	8.34E-02	1.76E+01
Total cPAHs	Lower	kg/yr	7.41E-06	6.51E-04	--	--	2.20E-02	3.43E+00	0.00E+00	0.00E+00	3.99E-02	8.20E+00
Total cPAHs	Upper	kg/yr	5.93E-05	7.03E-04	--	--	2.79E-02	4.88E+00	0.00E+00	0.00E+00	1.27E-01	2.72E+01

Table 6.1-9. Estimated Upland Groundwater Plume Loading to the Water Column, by Upland Site.

Analyte	Load Estimate	Units	Kinder Morgan		Rhône Poulenc		Siltronic		Willbridge		Entire Study Area	
			Peepers and Filtered	Peepers and Unfiltered								
			Push Probe ^a	Push Probe ^b								
cPAH BaPEq	Central	kg/yr	5.67E-06	3.22E-05	--	--	3.74E-03	1.22E+00	0.00E+00	0.00E+00	1.31E-02	4.79E+00
cPAH BaPEq	Lower	kg/yr	3.55E-06	3.01E-05	--	--	3.30E-03	9.97E-01	0.00E+00	0.00E+00	6.16E-03	2.27E+00
cPAH BaPEq	Upper	kg/yr	2.84E-05	5.49E-05	--	--	4.12E-03	1.42E+00	0.00E+00	0.00E+00	2.01E-02	7.37E+00
Total HPAHs	Central	kg/yr	3.20E-03	1.57E-02	--	--	6.78E-01	1.35E+01	1.72E-02	3.02E-02	1.35E+00	4.75E+01
Total HPAHs	Lower	kg/yr	2.60E-03	1.51E-02	--	--	6.06E-01	1.12E+01	1.43E-02	2.32E-02	8.30E-01	2.29E+01
Total HPAHs	Upper	kg/yr	9.66E-03	2.21E-02	--	--	7.43E-01	1.55E+01	2.26E-02	3.97E-02	1.89E+00	7.26E+01
Total LPAHs	Central	kg/yr	5.37E-02	7.65E-02	--	--	5.86E+01	6.06E+02	2.95E-01	3.54E-01	1.64E+02	8.63E+02
Total LPAHs	Lower	kg/yr	5.05E-02	7.32E-02	--	--	5.21E+01	4.97E+02	2.36E-01	2.76E-01	8.36E+01	5.28E+02
Total LPAHs	Upper	kg/yr	8.86E-02	1.11E-01	--	--	6.43E+01	7.02E+02	3.94E-01	4.71E-01	2.43E+02	1.16E+03
Total PAHs	Central	kg/yr	5.72E-02	9.20E-02	--	--	5.94E+01	6.20E+02	3.13E-01	3.85E-01	1.66E+02	9.11E+02
Total PAHs	Lower	kg/yr	5.34E-02	8.82E-02	--	--	5.29E+01	5.08E+02	2.50E-01	3.00E-01	8.47E+01	5.51E+02
Total PAHs	Upper	kg/yr	9.85E-02	1.33E-01	--	--	6.52E+01	7.19E+02	4.16E-01	5.11E-01	2.45E+02	1.23E+03
SVOCs												
1,2-Dichlorobenzene	Central	kg/yr	n/a	0.00E+00	n/a	3.55E+01	n/a	2.06E-03	n/a	0.00E+00	n/a	3.55E+01
1,2-Dichlorobenzene	Lower	kg/yr	n/a	0.00E+00	n/a	6.44E+00	n/a	1.68E-03	n/a	0.00E+00	n/a	6.45E+00
1,2-Dichlorobenzene	Upper	kg/yr	n/a	0.00E+00	n/a	6.74E+01	n/a	2.40E-03	n/a	0.00E+00	n/a	6.75E+01
VOCs												
1,2-Dichloroethane	Central	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	1.25E+00
1,2-Dichloroethane	Lower	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	1.53E-01
1,2-Dichloroethane	Upper	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	4.02E+00
1,1,2-Trichloroethane	Central	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	1.98E-02	n/a	0.00E+00	n/a	5.88E-01
1,1,2-Trichloroethane	Lower	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	1.61E-02	n/a	0.00E+00	n/a	7.60E-02
1,1,2-Trichloroethane	Upper	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	2.31E-02	n/a	0.00E+00	n/a	1.88E+00
1,2,4-Trimethylbenzene	Central	kg/yr	n/a	--	n/a	--	n/a	1.76E+00	n/a	--	n/a	4.48E+00
1,2,4-Trimethylbenzene	Lower	kg/yr	n/a	--	n/a	--	n/a	1.47E+00	n/a	--	n/a	2.43E+00
1,2,4-Trimethylbenzene	Upper	kg/yr	n/a	--	n/a	--	n/a	2.01E+00	n/a	--	n/a	6.49E+00
Benzene	Central	kg/yr	n/a	0.00E+00	n/a	1.61E-01	n/a	1.52E+01	n/a	0.00E+00	n/a	5.17E+01
Benzene	Lower	kg/yr	n/a	0.00E+00	n/a	3.45E-02	n/a	1.26E+01	n/a	0.00E+00	n/a	1.80E+01
Benzene	Upper	kg/yr	n/a	0.00E+00	n/a	3.01E-01	n/a	1.75E+01	n/a	0.00E+00	n/a	8.08E+01
Carbon disulfide	Central	kg/yr	n/a	6.13E-04	n/a	0.00E+00	n/a	8.06E-03	n/a	0.00E+00	n/a	6.91E-01
Carbon disulfide	Lower	kg/yr	n/a	3.83E-04	n/a	0.00E+00	n/a	6.56E-03	n/a	0.00E+00	n/a	6.86E-01
Carbon disulfide	Upper	kg/yr	n/a	3.06E-03	n/a	0.00E+00	n/a	9.38E-03	n/a	0.00E+00	n/a	1.38E+00
Chlorobenzene	Central	kg/yr	n/a	0.00E+00	n/a	1.36E+01	n/a	4.39E-03	n/a	0.00E+00	n/a	6.72E+01
Chlorobenzene	Lower	kg/yr	n/a	0.00E+00	n/a	3.45E+00	n/a	3.54E-03	n/a	0.00E+00	n/a	3.28E+01
Chlorobenzene	Upper	kg/yr	n/a	0.00E+00	n/a	2.48E+01	n/a	5.20E-03	n/a	0.00E+00	n/a	1.40E+02
Chloroethane	Central	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	8.94E-03	n/a	5.31E-02	n/a	1.70E+00
Chloroethane	Lower	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	7.28E-03	n/a	4.46E-02	n/a	1.68E+00
Chloroethane	Upper	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	1.04E-02	n/a	6.84E-02	n/a	1.73E+00
Chloroform	Central	kg/yr	n/a	1.30E-04	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	3.28E+00
Chloroform	Lower	kg/yr	n/a	8.11E-05	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	2.79E-01
Chloroform	Upper	kg/yr	n/a	6.49E-04	n/a	0.00E+00	n/a	0.00E+00	n/a	0.00E+00	n/a	2.77E+03
cis-1,2-Dichloroethene c	Central	kg/yr	n/a	0.00E+00	n/a	8.90E-01	n/a	3.46E+02	n/a	0.00E+00	n/a	3.47E+02
cis-1,2-Dichloroethene c	Lower	kg/yr	n/a	0.00E+00	n/a	1.61E-01	n/a	3.05E+02	n/a	0.00E+00	n/a	3.05E+02
cis-1,2-Dichloroethene c	Upper	kg/yr	n/a	0.00E+00	n/a	1.70E+00	n/a	3.82E+02	n/a	0.00E+00	n/a	3.84E+02
Methylene Chloride	Central	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	3.71E-03	n/a	0.00E+00	n/a	8.21E+02
Methylene Chloride	Lower	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	3.02E-03	n/a	0.00E+00	n/a	8.64E+01
Methylene Chloride	Upper	kg/yr	n/a	0.00E+00	n/a	0.00E+00	n/a	4.32E-03	n/a	0.00E+00	n/a	2.68E+03
Ethylbenzene	Central	kg/yr	n/a	0.00E+00	n/a	7.79E-03	n/a	4.01E+00	n/a	0.00E+00	n/a	9.00E+00
Ethylbenzene	Lower	kg/yr	n/a	0.00E+00	n/a	1.26E-03	n/a	3.31E+00	n/a	0.00E+00	n/a	3.70E+00
Ethylbenzene	Upper	kg/yr	n/a	0.00E+00	n/a	1.52E-02	n/a	4.63E+00	n/a	0.00E+00	n/a	1.36E+01
Toluene	Central	kg/yr	n/a	2.13E-04	n/a	0.00E+00	n/a	1.79E+00	n/a	5.95E-02	n/a	3.74E+00
Toluene	Lower	kg/yr	n/a	1.33E-04	n/a	0.00E+00	n/a	1.51E+00	n/a	4.81E-02	n/a	2.03E+00
Toluene	Upper	kg/yr	n/a	1.07E-03	n/a	0.00E+00	n/a	2.03E+00	n/a	8.08E-02	n/a	5.70E+00
Trichloroethene ^c	Central	kg/yr	n/a	0.00E+00	n/a	2.94E-02	n/a	7.09E-01	n/a	0.00E+00	n/a	4.45E+00
Trichloroethene ^c	Lower	kg/yr	n/a	0.00E+00	n/a	4.76E-03	n/a	6.55E-01	n/a	0.00E+00	n/a	1.05E+00
Trichloroethene ^c	Upper	kg/yr	n/a	0.00E+00	n/a	5.73E-02	n/a	2.67E+02	n/a	0.00E+00	n/a	2.80E+02

Table 6.1-9. Estimated Upland Groundwater Plume Loading to the Water Column, by Upland Site.

Analyte	Load Estimate	Units	Kinder Morgan		Rhone Poulenc		Siltronic		Willbridge		Entire Study Area	
			Peepers and Filtered	Peepers and Unfiltered								
			Push Probe ^a	Push Probe ^b								
Vinyl chloride ^c	Central	kg/yr	n/a	0.00E+00	n/a	6.41E-01	n/a	4.90E+01	n/a	0.00E+00	n/a	5.01E+01
Vinyl chloride ^c	Lower	kg/yr	n/a	0.00E+00	n/a	1.50E-01	n/a	4.25E+01	n/a	0.00E+00	n/a	4.27E+01
Vinyl chloride ^c	Upper	kg/yr	n/a	0.00E+00	n/a	1.19E+00	n/a	5.46E+01	n/a	0.00E+00	n/a	5.73E+01
Total Xylenes	Central	kg/yr	n/a	0.00E+00	n/a	5.71E-02	n/a	3.01E+00	n/a	2.10E-02	n/a	9.63E+00
Total Xylenes	Lower	kg/yr	n/a	0.00E+00	n/a	2.52E-02	n/a	2.50E+00	n/a	1.58E-02	n/a	2.95E+00
Total Xylenes	Upper	kg/yr	n/a	0.00E+00	n/a	9.29E-02	n/a	3.45E+00	n/a	2.81E-02	n/a	1.56E+01

Notes:

^a Push Probe refers to samples collected by either Trident or GeoProbe samplers.

^b Due to sample volume limitations, filtered Push Probe samples were not collected at all sample locations. To calculate loading rate estimates at these sample locations, the average of the filtered push-probe contaminant concentrations within the same flow zone were used.

^c Station GP-67 is located in Area 2 of the Siltronic site, which is understood to be an area impacted by a direct discharge of trichloroethene. Concentrations of trichloroethene and related degradation-chain chemicals (cis-1,2-Dichloroethene and vinyl chloride) measured at GP-67 are not representative of the upland groundwater plume; therefore, GP-67 was not included in loading calculations for these three contaminants for the Siltronic site or the entire Study Area. For comparison purposes, entire Study Area loads were also calculated for these three contaminants including station GP-67. These comparative loading results are as follows:

cis-1,2-Dichloroethene - central: 3.47E+02 kg/yr, lower: 3.05E+02, upper: 3.84E+02

Trichloroethene - central: 2.34E+02 kg/yr, lower: 1.88E+02, upper: 2.80E+02

Vinyl chloride - central: 5.01E+01 kg/yr, lower: 4.27E+01, upper: 5.73E+01

-- Analyte not sampled.

cPAH - carcinogenic polycyclic aromatic hydrocarbon

DDx - 2,4'- and 4,4'-DDD, DDE, and DDT

HPAH - high molecular weight polycyclic aromatic hydrocarbon

LPAH - low molecular weight polycyclic aromatic hydrocarbon

n/a - Indicates that filtered data was not available. Per sampling protocols filtered samples were not collected for VOCs or naphthalene.

PAH - polycyclic aromatic hydrocarbon

SVOC - semivolatle organic compound

VOC - volatile organic compound

Table 6.1-10. Subsurface and Surface Sediment Advective Annual Loads in the Study Area RM 1.9 - 11.8 (kg/yr).

Analyte	Subsurface Advective Loading			Surface Advective Loading		
	Primary Loading Estimate (kg/yr)	Upper Loading Estimate (kg/yr)	Lower Loading Estimate (kg/yr)	Primary Loading Estimate (kg/yr)	Upper Loading Estimate (kg/yr)	Lower Loading Estimate (kg/yr)
Metals						
Arsenic	8.92E+01	5.54E+02	1.13E+00	1.98E+02	1.22E+03	2.50E+00
Copper	1.37E+02	7.44E+04	2.74E-01	1.78E+02	9.25E+04	3.55E-01
Lead	6.30E+00	2.49E+03	2.51E-02	6.91E+00	2.73E+03	2.75E-02
Mercury	1.53E-02	1.92E-01	1.21E-03	1.36E-02	1.71E-01	1.08E-03
Butyltins						
Tributyltin Ion	3.64E+01	1.86E+03	2.29E-02	9.76E+00	5.47E+02	6.12E-03
PCBs						
PCB077	1.42E-04	1.04E-03	7.70E-05	5.48E-05	4.02E-04	2.98E-05
PCB081	1.81E-05	3.83E-05	8.22E-06	5.20E-06	1.10E-05	2.36E-06
PCB105	5.85E-04	1.31E-03	2.50E-04	1.77E-04	3.95E-04	7.57E-05
PCB118	1.61E-03	5.79E-03	4.01E-04	7.01E-04	2.51E-03	1.74E-04
PCB126	1.06E-05	2.11E-05	5.17E-06	3.76E-06	7.47E-06	1.84E-06
PCB169	2.70E-08	3.52E-08	2.09E-08	8.87E-09	1.16E-08	6.87E-09
Total PCBs	7.80E-02	9.27E-01	2.86E-02	1.16E-01	6.36E-01	2.85E-02
PCDD/Fs						
Total PCDD/Fs	5.60E-06	4.63E-05	2.55E-06	1.41E-05	4.86E-05	8.71E-06
DDx						
4,4'-DDD	1.42E-02	9.93E-02	7.53E-03	5.19E-03	3.63E-02	2.75E-03
4,4'-DDT	5.20E-03	3.27E-01	3.35E-03	3.60E-03	2.26E-01	2.32E-03
Total DDE	6.41E-04	1.77E-02	5.55E-04	5.64E-04	1.55E-02	4.86E-04
Total DDD	1.73E-02	1.16E-01	8.80E-03	8.16E-03	5.22E-02	3.95E-03
Total DDT	6.10E-03	3.68E-01	3.77E-03	4.32E-03	2.58E-01	2.65E-03
Total DDx	2.41E-02	5.01E-01	1.31E-02	1.30E-02	3.26E-01	7.09E-03
Pesticides (non-DDx)						
Total chlordanes	8.17E-04	2.88E-02	8.17E-04	3.31E-04	9.17E-03	3.31E-04
gamma-Hexachlorocyclohexane (Lindane)	5.86E-02	1.64E-01	4.03E-02	9.38E-02	2.69E-01	6.42E-02
Aldrin	8.88E-05	8.54E-04	7.20E-06	1.00E-04	9.63E-04	8.12E-06
Dieldrin	7.61E-04	8.17E-03	1.16E-04	6.65E-04	7.14E-03	1.02E-04
PAHs						
Naphthalene	3.99E+02	6.09E+02	2.38E+02	3.16E+01	4.80E+01	1.89E+01
Benzo(a)pyrene	4.72E-01	9.96E-01	1.04E-01	7.04E-01	1.49E+00	1.55E-01
Total cPAHs	2.48E+00	6.15E+00	1.57E+00	3.64E+00	9.13E+00	2.33E+00
cPAH BaPEq	5.74E-01	1.31E+00	1.78E-01	8.62E-01	1.99E+00	2.71E-01
Total PAHs	5.62E+02	8.83E+02	3.57E+02	1.96E+02	3.81E+02	1.39E+02
SVOCs						
Bis(2-ethylhexyl)phthalate	4.40E-03	3.11E+01	3.54E-05	8.50E-03	6.64E+01	6.85E-05

Notes:

- BaPEq - benzo(a)pyrene equivalent
- cPAH - carcinogenic polycyclic aromatic hydrocarbon
- DDx - 2,4'- and 4,4'-DDD, DDE, and DDT
- PAH - polycyclic aromatic hydrocarbon
- PCB - polychlorinated biphenyl
- PCDD/F - dioxin/furan
- RM - river mile
- SVOC - semivolatile organic compound

Table 6.1-11. Summary of Central Estimates of Annual Loading to the Study Area for Indicator Contaminants (kg/yr).^a

Analyte	Central Estimate of Annual Loading							
	Total Combined Estimated External Load	External Loads to Study Area					Internal Load within Study Area	
		Surface Water at RM 11.8 ^b	Direct Permitted Non-Stormwater Discharges	Stormwater Runoff	Atmospheric Deposition to Water Surface	Upland Groundwater Plumes	Subsurface Sediment Advection	Surface Sediment Advection
PCBs								
PCB077	1.35E-02	9.31E-03	-	4.08E-03	-	-	1.42E-04	5.48E-05
PCB081	1.82E-04	3.60E-05	-	1.28E-04	-	-	1.81E-05	5.20E-06
PCB105	8.22E-02	5.25E-02	-	2.91E-02	-	-	5.85E-04	1.77E-04
PCB118	2.05E-01	1.35E-01	-	6.83E-02	-	-	1.61E-03	7.01E-04
PCB126	8.60E-04	2.75E-04	-	5.74E-04	-	-	1.06E-05	3.76E-06
PCB156 & PCB157	2.87E-02	1.73E-02	-	1.13E-02	-	-	-	-
PCB169	1.26E-04	7.21E-05	-	5.42E-05	-	-	2.70E-08	8.87E-09
Total PCB Congeners	4.71E+00	4.71E+00	-	-	-	-	-	1.16E-01
Total PCBs	7.44E+00	4.71E+00	-	2.03E+00	6.25E-01	-	7.80E-02	1.16E-01
PCB TEQ (ND=0)	1.01E-04	3.76E-05	-	5.49E-05	8.53E-06	-	-	-
PCDD/Fs								
Total PCDD/Fs	5.99E-01	5.99E-01	-	-	-	-	5.60E-06	1.41E-05
TCDD TEQ (ND=0)	1.48E-03	1.45E-03	-	-	3.20E-05	-	-	-
Pesticides								
4,4'-DDD	1.12E+00	1.06E+00	-	4.17E-02	-	2.00E-04	1.42E-02	5.19E-03
4,4'-DDE	1.27E-01	-	-	-	1.27E-01	-	-	-
4,4'-DDT	3.46E+00	3.25E+00	-	1.66E-01	4.02E-02	1.71E-05	5.20E-03	3.60E-03
Total DDE	2.59E+00	2.50E+00	-	9.34E-02	-	6.93E-06	6.41E-04	5.64E-04
Total DDD	1.43E+00	1.33E+00	-	6.39E-02	-	2.05E-02	1.73E-02	8.16E-03
Total DDT	3.95E+00	3.70E+00	-	2.38E-01	-	1.05E-03	6.10E-03	4.32E-03
Total DDx	7.97E+00	7.53E+00	-	3.95E-01	1.67E-01 ^c	2.16E-02	2.41E-02	1.30E-02
Total chlordanes	1.27E+00	1.22E+00	-	4.08E-02	1.00E-02	-	8.17E-04	3.31E-04
γ-Hexachlorocyclohexane (Lindane)	6.48E-01	5.77E-01	-	1.26E-02	-	-	5.86E-02	9.38E-02
Aldrin	7.37E-02	6.64E-02	-	6.90E-03	3.19E-04	-	8.88E-05	1.00E-04
Dieldrin	3.51E+00	3.49E+00	-	1.46E-02	2.63E-03	-	7.61E-04	6.65E-04
PAHs								
Total PAHs	1.13E+03	3.80E+02	1.24E+00	1.51E+01	7.18E+00	1.66E+02	5.62E+02	1.96E+02
Benzo(a)pyrene	7.19E+00	5.09E+00	5.30E-02	7.53E-01	8.10E-01	9.36E-03	4.72E-01	7.04E-01
Naphthalene	6.24E+02	9.66E+01	-	5.71E-01	2.83E+00	1.25E+02 ^d	3.99E+02	3.16E+01
Total cPAHs	4.34E+01	3.59E+01	-	1.25E+00	3.65E+00	8.34E-02	2.48E+00	3.64E+00
cPAH BaPEq	8.15E+00	6.87E+00	-	-	6.92E-01	1.31E-02	5.74E-01	8.62E-01
Total HPAHs	9.72E+01	9.59E+01	-	-	-	1.35E+00	-	-
Total LPAHs	4.37E+02	2.73E+02	-	-	-	1.64E+02	-	-

Table 6.1-11. Summary of Central Estimates of Annual Loading to the Study Area for Indicator Contaminants (kg/yr).^a

Analyte	Central Estimate of Annual Loading							
	Total Combined Estimated External Load	External Loads to Study Area					Internal Load within Study Area	
		Surface Water at RM 11.8 ^b	Direct Permitted Non-Stormwater Discharges	Stormwater Runoff	Atmospheric Deposition to Water Surface	Upland Groundwater Plumes	Subsurface Sediment Advection	Surface Sediment Advection
Petroleum Hydrocarbons								
Total Petroleum Hydrocarbons (Diesel)	3.60E+03	-	-	-	3.60E+03	-	-	-
Metals								
Arsenic	9.64E+03	9.49E+03	9.30E-02	2.91E+01	7.32E+00	2.70E+01	8.92E+01	1.98E+02
Barium	2.43E+02	-	-	-	-	2.43E+02	-	-
Cadmium	6.47E-01	-	4.20E-01	-	-	2.27E-01	-	-
Chromium	2.12E+04	2.11E+04	4.65E-01	8.30E+01	6.10E+00	3.16E+00	2.14E+00	4.58E+00
Copper	4.71E+04	4.65E+04	6.45E+01	3.73E+02	3.06E+01	6.65E-01	1.37E+02	1.78E+02
Lead	9.81E+03	9.38E+03	7.89E+01	3.24E+02	1.69E+01	2.60E-01	6.30E+00	6.91E+00
Manganese	7.96E+03	-	-	-	-	7.96E+03	-	-
Mercury	2.61E+02	2.32E+02	2.75E-04	5.00E-01	2.89E+01	2.38E-02	1.53E-02	1.36E-02
Nickel	2.62E+04	2.61E+04	-	6.19E+01	8.79E+00	9.97E+00	-	-
Zinc	9.57E+04	9.24E+04	4.49E+02	2.66E+03	7.88E+01	6.52E+00	1.17E+02	1.17E+02
VOCs								
1,2-Dichloroethane	1.25E+00	-	-	-	-	1.25E+00 ^d	-	-
1,1,2-Trichloroethane	5.88E-01	-	-	-	-	5.88E-01 ^d	-	-
1,2,4-Trimethylbenzene	4.48E+00	-	-	-	-	4.48E+00 ^d	-	-
Benzene	5.49E+01	-	3.19E+00	-	-	5.17E+01 ^d	-	-
Carbon disulfide	6.91E-01	-	-	-	-	6.91E-01 ^d	-	-
Chlorobenzene	6.72E+01	-	-	-	-	6.72E+01 ^d	-	-
Chloroethane	1.70E+00	-	-	-	-	1.70E+00 ^d	-	-
Chloroform	3.28E+00	-	-	-	-	3.28E+00 ^d	-	-
cis-1,2-Dichloroethene	3.47E+02	-	-	-	-	3.47E+02 ^d	-	-
Methylene chloride	8.21E+02	-	-	-	-	8.21E+02 ^d	-	-
Ethylbenzene	9.00E+00	-	-	-	-	9.00E+00 ^d	-	-
Toluene	3.74E+00	-	-	-	-	3.74E+00 ^d	-	-
Trichloroethene	4.45E+00	-	-	-	-	4.45E+00 ^d	-	-
Vinyl chloride	5.01E+01	-	-	-	-	5.01E+01 ^d	-	-
Total Xylenes	9.63E+00	-	-	-	-	9.63E+00 ^d	-	-

Table 6.1-11. Summary of Central Estimates of Annual Loading to the Study Area for Indicator Contaminants (kg/yr).^a

Analyte	Central Estimate of Annual Loading							
	Total Combined Estimated External Load	External Loads to Study Area					Internal Load within Study Area	
		Surface Water at RM 11.8 ^b	Direct Permitted Non-Stormwater Discharges	Stormwater Runoff	Atmospheric Deposition to Water Surface	Upland Groundwater Plumes	Subsurface Sediment Advection	Surface Sediment Advection
SVOCs								
Bis(2-ethylhexyl)phthalate	7.56E+03	7.54E+03	-	2.08E+01	-	-	4.40E-03	8.50E-03
Hexachlorobenzene	1.26E+00	1.02E+00	-	1.12E-01	1.29E-01	-	-	-
1,2-Dichlorobenzene	3.55E+01	-	-	-	-	3.55E+01 ^d	-	-
Butyltins								
Tributyltin Ion	4.74E+01	1.10E+01	-	-	-	-	3.64E+01	9.76E+00

Notes:

^a Loads are presented for only those contaminants which are on the contaminant lists specific to individual loading terms (see Table 6.0-1).

^b Upstream (RM 11.8) surface water load estimated based on combined data from RM 16 and RM 11, with RM 11 outlying data values excluded.

^c Sum of 4,4'-DDE and 4,4'-DDT.

^d Transition zone water samples for volatile chemicals were not filtered due to potential losses from the filtration process. The central load estimates shown here are based on peeper and unfiltered push probe data.

- Indicates that no load was estimated.

Bold font indicates the maximum loading term for each contaminant.

BaPEq - benzo(a)pyrene equivalent

cPAH - carcinogenic polycyclic aromatic hydrocarbon

DDx - 2,4'- and 4,4'-DDD, DDE, and DDT

HPAH - high molecular weight polycyclic aromatic hydrocarbon

IC - indicator contaminant

LPAH - low molecular weight polycyclic aromatic hydrocarbon

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

PCDD/F - dioxin/furan

RM - river mile

SVOC - semivolatile organic compound

TEQ - toxic equivalent concentration

VOC - volatile organic compound

Table 6.3-1. Summary Statistics for All Depositional Cores Combined.

Analyte	Units	# Analyzed	# Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
					Minimum ^a	Maximum ^a	Mean	Median ^b	95th ^b	Minimum (full DL) ^a	Maximum (full DL) ^a	Mean (half DL)	Median (half DL) ^b	95th (half DL) ^b
Grain Size														
Fines	percent	28	28	100	4.99 T	83.8 T	57.2	64.5	78.1	4.99 T	83.8 T	57.2	64.5	78.1
Conventionals														
Total organic carbon	percent	29	29	100	0.4	4.16	2.27	2.37	3.33	0.4	4.16	2.27	2.37	3.33
Metals														
Arsenic	mg/kg	29	29	100	3.12	7.77 J	5.27	5.25	6.77	3.12	7.77 J	5.27	5.25	6.77
Cadmium	mg/kg	29	29	100	0.12	0.31	0.227	0.23	0.29	0.12	0.31	0.227	0.23	0.29
Chromium	mg/kg	29	29	100	24.2	44.7	35.8	37.6	41.4	24.2	44.7	35.8	37.6	41.4
Copper	mg/kg	29	29	100	21.1	71.6	40.4	40.5	59.4	21.1	71.6	40.4	40.5	59.4
Lead	mg/kg	29	29	100	8.2 J	17	13.2	13.6	16	8.2 J	17	13.2	13.6	16
Mercury	mg/kg	29	29	100	0.023	0.107 J	0.0604	0.0565	0.0966	0.023	0.107 J	0.0604	0.0565	0.0966
Nickel	mg/kg	29	29	100	19.7 J	35.8 J	30.6	30.1	35.5	19.7 J	35.8 J	30.6	30.1	35.5
Zinc	mg/kg	29	29	100	58	106	88	90.6	101	58	106	88	90.6	101
PCB Aroclors														
Aroclors	µg/kg	29	10	34	11 JT	22 T	15.3	15	21.6	2.5 UT	22 T	6.9	3.6	19.8
Pesticides														
Aldrin	µg/kg	29	10	34	0.26 J	0.81 J	0.507	0.48	0.77	0.22 U	0.81 J	0.275	0.155	0.712
Dieldrin	µg/kg	29	0	0						0.42 U	0.78 U	0.274	0.27	0.338
gamma-Hexachlorocyclohexane (Lindane)	µg/kg	29	0	0						0.22 U	1.7 U	0.201	0.15	0.498
Total chlordanes	µg/kg	29	26	90	0.18 JT	1.1 JT	0.608	0.555	1	0.18 JT	1.1 JT	0.576	0.53	1
Total DDD	µg/kg	29	28	97	0.21 JT	2.8 JT	0.903	0.75	1.87	0.21 JT	2.8 JT	0.877	0.73	1.86
Total DDx	µg/kg	29	29	100	0.24 JT	11 JT	3.86	3.8	6.42	0.24 JT	11 JT	3.86	3.8	6.42
Total DDE	µg/kg	29	29	100	0.24 JT	2.2 JT	1.36	1.4	2.06	0.24 JT	2.2 JT	1.36	1.4	2.06
Total DDT	µg/kg	29	24	83	0.29 JT	7.6 JT	1.96	1.65	3.5	0.23 UT	7.6 JT	1.68	1.6	3.32
Polycyclic Aromatic Hydrocarbons														
Benzo(a)pyrene	µg/kg	29	29	100	6.3	50	15.8	13	30.4	6.3	50	15.8	13	30.4
Total HPAHs	µg/kg	29	29	100	65 JT	370 T	181	160	338	65 JT	370 T	181	160	338
Total LPAHs	µg/kg	29	29	100	10 JT	140 T	47.8	39	118	10 JT	140 T	47.8	39	118
Naphthalene	µg/kg	29	19	66	8.9	19	13	12	18.1	0.58 U	19	8.61	10	17.6
Phenanthrene	µg/kg	29	29	100	5.3	81	23.6	20	64	5.3	81	23.6	20	64
Total cPAHs	µg/kg	29	29	100	35 JT	240 T	90.8	85	156	35 JT	240 T	90.8	85	156
Total PAHs	µg/kg	29	29	100	75 JT	510 T	229	210	434	75 JT	510 T	229	210	434
Phthalates														
Bis(2-ethylhexyl) phthalate	µg/kg	29	28	97	21	330	105	73.5	250	21	330	102	73	248
Butylbenzyl phthalate	µg/kg	29	1	3.4	210	210	210	210		2.2 U	210	9.59	1.5	8.1

Table 6.3-1. Summary Statistics for All Depositional Cores Combined.

Analyte	Units	# Analyzed	# Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
					Minimum ^a	Maximum ^a	Mean	Median ^b	95th ^b	Minimum (full DL) ^a	Maximum (full DL) ^a	Mean (half DL)	Median (half DL) ^b	95th (half DL) ^b
Semivolatile Organic Compounds														
Hexachlorobenzene	µg/kg	29	1	3.4	0.62 J	0.62 J	0.62	0.62		0.12 U	5.1 U	0.429	0.08	2.1
Phenols														
Pentachlorophenol	µg/kg	29	13	45	0.36 J	2.8 J	0.973	0.8	1.96	0.2 U	3 U	0.618	0.42	1.46
Petroleum														
Total Petroleum Hydrocarbons (Diesel)	mg/kg	29	29	100	5.3 J	110 J	51	47	91.6	5.3 J	110 J	51	47	91.6
Total Petroleum Hydrocarbons (Residual)	mg/kg	29	29	100	73 J	1000 J	518	520	968	73 J	1000 J	518	520	968
Total Petroleum Hydrocarbons	mg/kg	29	29	100	82 JT	1100 JT	571	570	1060	82 JT	1100 JT	571	570	1060
PCDD/Fs														
Total PCDD/Fs	pg/g	29	29	100	12.64 JT	4083 JT	299	91.3	675	12.64 JT	4083 JT	299	91.3	675
TCDD TEQ	pg/g	29	29	100	0.0161 JT	5.78 JT	0.536	0.175	1.62	0.0161 JT	5.78 JT	0.536	0.175	1.62

Notes:

^a Whenever several result values match maximum or minimum value, qualifier and descriptor preference has been given in the following order: U over J over A over N over T over no qualification.

^b Median is the exact result value ranking as the 0.50 percentile in an ascending list of all results, and 95th percentile is the exact result value of the 0.95 ranking result. When the ascending list of all results doesn't produce an exact match to the corresponding percentile rank, average of two adjacent results ranking closest to 0.50 percentile is the median, and an interpolated value is the 95th percentile. Such median or 95th percentile value is not qualified. It is qualified with "U" if both results ranking immediately above and below the corresponding percentile are "U" qualified, and with "J" if at least one of the results is "J" qualified.

cPAH - carcinogenic polycyclic aromatic hydrocarbon

DDx - total of 2,4' and 4,4'-DDD, -DDE, -DDT

DL - detection limit

HPAH - high molecular weight polycyclic aromatic hydrocarbon

LPAH - low molecular weight polycyclic aromatic hydrocarbon

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

PCDD/F - dioxin/furan

TEQ - toxic equivalent concentration

Reason codes for qualifiers:

J - The associated numerical value is an estimated quantity.

N - Presumptive evidence of presence of material; identification of the compound is not definitive.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Reason codes for descriptors:

A - Total value based on limited number of analytes.

T - The associated numerical value was mathematically derived (e.g., from summing multiple analyte results such as Aroclors, or calculating the average of multiple results for a single analyte). Also indicates all results that are selected for reporting in preference to other available results (e.g., for parameters reported by multiple methods) for the Round 2 data.

Table 6.3-2. Summary Statistics for RC483.

Analyte	Units	# Analyzed	# Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
					Minimum ^a	Maximum ^a	Mean	Median ^b	95th ^b	Minimum (full DL) ^a	Maximum (full DL) ^a	Mean (half DL)	Median (half DL) ^b	95th (half DL) ^b
Grain Size														
Fines	percent	10	10	100	44.3 T	75.1 T	66.7	69.6	74.2	44.3 T	75.1 T	66.7	69.6	74.2
Conventionals														
Total organic carbon	percent	10	10	100	1.77	3.14	2.54	2.71	3.08	1.77	3.14	2.54	2.71	3.08
Metals														
Arsenic	mg/kg	10	10	100	4.58 T	6.62 J	5.86	5.89	6.58	4.58 T	6.62 J	5.86	5.89	6.58
Cadmium	mg/kg	10	10	100	0.205 T	0.27	0.248	0.26	0.27	0.205 T	0.27	0.248	0.26	0.27
Chromium	mg/kg	10	10	100	24.2	44.7	37.3	38.1	43.4	24.2	44.7	37.3	38.1	43.4
Copper	mg/kg	10	10	100	24.6	71.6	45	42.7	66.2	24.6	71.6	45	42.7	66.2
Lead	mg/kg	10	10	100	12 J	15.2 J	13.7	13.8	15.1	12 J	15.2 J	13.7	13.8	15.1
Mercury	mg/kg	10	10	100	0.047	0.094	0.0653	0.0595	0.0936	0.047	0.094	0.0653	0.0595	0.0936
Nickel	mg/kg	10	10	100	27.8 T	35.8 J	32.7	32.7	35.7	27.8 T	35.8 J	32.7	32.7	35.7
Zinc	mg/kg	10	10	100	58	99.1	88.5	92	98.7	58	99.1	88.5	92	98.7
PCB Aroclors														
Aroclors	µg/kg	10	2	20	11 T	11 T	11	11	11	4 UT	11 T	4.51	3.28	11
Pesticides														
Aldrin	µg/kg	10	6	60	0.32 J	0.55 J	0.43	0.42	0.543	0.27 U	0.66 U	0.334	0.34	0.537
Dieldrin	µg/kg	10	0	0						0.48 U	0.7 U	0.288	0.283	0.337
gamma-Hexachlorocyclohexane (Lindane)	µg/kg	10	0	0						0.27 U	1 U	0.189	0.153	0.356
Total chlordanes	µg/kg	10	9	90	0.42 JT	1.1 JT	0.706	0.62	1.06	0.42 JT	1.1 JT	0.671	0.575	1.06
Total DDD	µg/kg	10	10	100	0.48 JT	1.8 JT	0.963	0.87	1.62	0.48 JT	1.8 JT	0.963	0.87	1.62
Total DDx	µg/kg	10	10	100	2.2 JT	11 JT	4.59	4.15	8.43	2.2 JT	11 JT	4.59	4.15	8.43
Total DDE	µg/kg	10	10	100	1.1 T	2.1 T	1.53	1.5	2.06	1.1 T	2.1 T	1.53	1.5	2.06
Total DDT	µg/kg	10	8	80	1.2 JT	7.6 JT	2.58	1.75	5.96	1 UT	7.6 JT	2.18	1.55	5.48
Polycyclic Aromatic Hydrocarbons														
Benzo(a)pyrene	µg/kg	10	10	100	13	21	16.1	15.5	21	13	21	16.1	15.5	21
Total HPAHs	µg/kg	10	10	100	140 JT	240 JT	192	200	236	140 JT	240 JT	192	200	236
Total LPAHs	µg/kg	10	10	100	29 JT	59 T	47.3	49.5	58.1	29 JT	59 T	47.3	49.5	58.1
Naphthalene	µg/kg	10	9	90	8.9	17	12.1	12	15.8	0.76 U	17	11	11	15.7
Phenanthrene	µg/kg	10	10	100	15	28	21.7	21.5	27.6	15	28	21.7	21.5	27.6
Total cPAHs	µg/kg	10	10	100	75 JT	130 JT	96.5	92.5	126	75 JT	130 JT	96.5	92.5	126
Total PAHs	µg/kg	10	10	100	180 JT	270 JT	238	255	270	180 JT	270 JT	238	255	270
Phthalates														
Bis(2-ethylhexyl) phthalate	µg/kg	10	10	100	53	170	88.2	74	152	53	170	88.2	74	152
Butylbenzyl phthalate	µg/kg	10	0	0						2.5 U	12 U	2.52	1.58	5.78

Table 6.3-2. Summary Statistics for RC483.

Analyte	Units	# Analyzed	# Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations					
					Minimum ^a	Maximum ^a	Mean	Median ^b	95th ^b	Minimum (full DL) ^a	Maximum (full DL) ^a	Mean (half DL)	Median (half DL) ^b	95th (half DL) ^b	
Semivolatile Organic Compounds															
Hexachlorobenzene	µg/kg	10	1	10	0.62 J	0.62 J	0.62	0.62			0.14 U	5.1 U	0.379	0.0775	1.68
Phenols															
Pentachlorophenol	µg/kg	10	2	20	0.36 J	1 J	0.68	0.68	0.968		0.33 U	1 J	0.335	0.24	0.743
Petroleum															
Total Petroleum Hydrocarbons (Diesel)	mg/kg	10	10	100	36 J	78 J	54.7	47	77.1		36 J	78 J	54.7	47	77.1
Total Petroleum Hydrocarbons (Residual)	mg/kg	10	10	100	370 J	780 J	578	560	776		370 J	780 J	578	560	776
Total Petroleum Hydrocarbons	mg/kg	10	10	100	410 JT	860 JT	636	620	851		410 JT	860 JT	636	620	851
PCDD/Fs															
Total PCDD/Fs	pg/g	10	10	100	12.64 JT	253.3 T	95.8	63.6	224		12.64 JT	253.3 T	95.8	63.6	224
TCDD TEQ	pg/g	10	10	100	0.0161 JT	0.63 JT	0.181	0.103	0.5		0.0161 JT	0.63 JT	0.181	0.103	0.5

Notes:

^a Whenever several result values match maximum or minimum value, qualifier and descriptor preference has been given in the following order: U over J over A over N over T over no qualification.

^b Median is the exact result value ranking as the 0.50 percentile in an ascending list of all results, and 95th percentile is the exact result value of the 0.95 ranking result. When the ascending list of all results doesn't produce an exact match to the corresponding percentile rank, average of two adjacent results ranking closest to 0.50 percentile is the median, and an interpolated value is the 95th percentile. Such median or 95th percentile value is not qualified. It is qualified with "U" if both results ranking immediately above and below the corresponding percentile are "U" qualified, and with "J" if at least one of the results is "J" qualified.

cPAH - carcinogenic polycyclic aromatic hydrocarbon

DDx - total of 2,4' and 4,4'-DDD, -DDE, -DDT

DL - detection limit

HPAH - high molecular weight polycyclic aromatic hydrocarbon

LPAH - low molecular weight polycyclic aromatic hydrocarbon

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

PCDD/F - dioxin/furan

TEQ - toxic equivalent concentration

Reason codes for qualifiers:

J - The associated numerical value is an estimated quantity.

N - Presumptive evidence of presence of material; identification of the compound is not definitive.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Reason codes for descriptors:

A - Total value based on limited number of analytes.

T - The associated numerical value was mathematically derived (e.g., from summing multiple analyte results such as Aroclors, or calculating the average of multiple results for a single analyte). Also indicates all results that are selected for reporting in preference to other available results (e.g., for parameters reported by multiple methods) for the Round 2 data.

Table 6.3-3. Summary Statistics for RC01.

Analyte	Units	# Analyzed	# Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
					Minimum ^a	Maximum ^a	Mean	Median ^b	95th ^b	Minimum (full DL) ^a	Maximum (full DL) ^a	Mean (half DL)	Median (half DL) ^b	95th (half DL) ^b
Grain Size														
Fines	percent	8	8	100	4.99 T	83.8 T	45.5	47.8	78	4.99 T	83.8 T	45.5	47.8	78
Conventionals														
Total organic carbon	percent	9	9	100	0.4	4.16	2.53	2.94	3.83	0.4	4.16	2.53	2.94	3.83
Metals														
Arsenic	mg/kg	9	9	100	3.39 J	7.77 J	5.66	5.25	7.39	3.39 J	7.77 J	5.66	5.25	7.39
Cadmium	mg/kg	9	9	100	0.12	0.31	0.225	0.21	0.306	0.12	0.31	0.225	0.21	0.306
Chromium	mg/kg	9	9	100	25.7	40.3	35.5	38.1	40	25.7	40.3	35.5	38.1	40
Copper	mg/kg	9	9	100	21.1	47.5	36.2	36.4	46.5	21.1	47.5	36.2	36.4	46.5
Lead	mg/kg	9	9	100	8.2 J	15.7 J	12.6	11.8	15.7	8.2 J	15.7 J	12.6	11.8	15.7
Mercury	mg/kg	9	9	100	0.023	0.06	0.0487	0.055	0.0592	0.023	0.06	0.0487	0.055	0.0592
Nickel	mg/kg	9	9	100	25.6 J	35.5 J	31.4	30.1	35.1	25.6 J	35.5 J	31.4	30.1	35.1
Zinc	mg/kg	9	9	100	72.6	102	88.5	90.6	100	72.6	102	88.5	90.6	100
PCB Aroclors														
Aroclors	µg/kg	9	1	11	11 JT	11 JT	11	11		2.5 UT	11 JT	3.41	2.3	8.12
Pesticides														
Aldrin	µg/kg	9	4	44	0.26 J	0.81 J	0.623	0.71	0.797	0.22 U	0.81 J	0.363	0.2	0.774
Dieldrin	µg/kg	9	0	0						0.42 U	0.78 U	0.281	0.275	0.362
gamma-Hexachlorocyclohexane (Lindane)	µg/kg	9	0	0						0.22 U	0.99 U	0.194	0.15	0.393
Total chlordanes	µg/kg	9	8	89	0.3 JT	1 JT	0.621	0.59	1	0.3 JT	1 JT	0.582	0.58	1
Total DDD	µg/kg	9	8	89	0.21 JT	1.4 JT	0.72	0.665	1.26	0.21 JT	1.4 JT	0.657	0.6	1.24
Total DDx	µg/kg	9	9	100	0.24 JT	5.7 JT	3.03	3.5	5.34	0.24 JT	5.7 JT	3.03	3.5	5.34
Total DDE	µg/kg	9	9	100	0.24 JT	2 T	1.17	1.1	1.92	0.24 JT	2 T	1.17	1.1	1.92
Total DDT	µg/kg	9	6	67	0.48 JT	3.6 JT	1.81	1.7	3.35	0.23 UT	3.6 JT	1.29	0.75	3.2
Polycyclic Aromatic Hydrocarbons														
Benzo(a)pyrene	µg/kg	9	9	100	6.3	50	17	12	43.6	6.3	50	17	12	43.6
Total HPAHs	µg/kg	9	9	100	65 JT	350 T	165	130	338	65 JT	350 T	165	130	338
Total LPAHs	µg/kg	9	9	100	10 JT	130 T	44.4	36	99.6	10 JT	130 T	44.4	36	99.6
Naphthalene	µg/kg	9	6	67	10	19	14.3	13.5	18.8	0.58 U	19	9.66	12	18.6
Phenanthrene	µg/kg	9	9	100	5.3	70	19.9	13	50.4	5.3	70	19.9	13	50.4
Total cPAHs	µg/kg	9	9	100	35 JT	240 T	90.6	65	208	35 JT	240 T	90.6	65	208
Total PAHs	µg/kg	9	9	100	75 JT	450 T	212	170	422	75 JT	450 T	212	170	422
Phthalates														
Bis(2-ethylhexyl) phthalate	µg/kg	9	8	89	51	140	82.5	72	140	41 U	140	75.6	71	140
Butylbenzyl phthalate	µg/kg	9	0	0						2.2 U	19 U	2.99	1.5	7.56

Table 6.3-3. Summary Statistics for RC01.

Analyte	Units	# Analyzed	# Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
					Minimum ^a	Maximum ^a	Mean	Median ^b	95th ^b	Minimum (full DL) ^a	Maximum (full DL) ^a	Mean (half DL)	Median (half DL) ^b	95th (half DL) ^b
Semivolatile Organic Compounds														
Hexachlorobenzene	µg/kg	9	0	0						0.12 U	4.4 U	0.409	0.08	1.54
Phenols														
Pentachlorophenol	µg/kg	9	3	33	0.42 J	1.2 J	0.843	0.91	1.17	0.2 U	3 U	0.554	0.375	1.38
Petroleum														
Total Petroleum Hydrocarbons (Diesel)	mg/kg	9	9	100	5.3 J	110 J	56.5	54	104	5.3 J	110 J	56.5	54	104
Total Petroleum Hydrocarbons (Residual)	mg/kg	9	9	100	91 J	1000 J	583	560	1000	91 J	1000 J	583	560	1000
Total Petroleum Hydrocarbons	mg/kg	9	9	100	96 JT	1100 JT	641	620	1100	96 JT	1100 JT	641	620	1100
PCDD/Fs														
Total PCDD/Fs	pg/g	9	9	100	41.01 JT	4083 JT	596	167	2560	41.01 JT	4083 JT	596	167	2560
TCDD TEQ	pg/g	9	9	100	0.0758 JT	5.78 JT	0.969	0.387	3.72	0.0758 JT	5.78 JT	0.969	0.387	3.72

Notes:

^a Whenever several result values match maximum or minimum value, qualifier and descriptor preference has been given in the following order: U over J over A over N over T over no qualification.

^b Median is the exact result value ranking as the 0.50 percentile in an ascending list of all results, and 95th percentile is the exact result value of the 0.95 ranking result. When the ascending list of all results doesn't produce an exact match to the corresponding percentile rank, average of two adjacent results ranking closest to 0.50 percentile is the median, and an interpolated value is the 95th percentile. Such median or 95th percentile value is not qualified. It is qualified with "U" if both results ranking immediately above and below the corresponding percentile are "U" qualified, and with "J" if at least one of the results is "J" qualified.

cPAH - carcinogenic polycyclic aromatic hydrocarbon

DDx - total of 2,4' and 4,4'-DDD, -DDE, -DDT

DL - detection limit

HPAH - high molecular weight polycyclic aromatic hydrocarbon

LPAH - low molecular weight polycyclic aromatic hydrocarbon

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

PCDD/F - dioxin/furan

TEQ - toxic equivalent concentration

Reason codes for qualifiers:

J - The associated numerical value is an estimated quantity.

N - Presumptive evidence of presence of material; identification of the compound is not definitive.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Reason codes for descriptors:

A - Total value based on limited number of analytes.

T - The associated numerical value was mathematically derived (e.g., from summing multiple analyte results such as Aroclors, or calculating the average of multiple results for a single analyte). Also indicates all results that are selected for reporting in preference to other available results (e.g., for parameters reported by multiple methods) for the Round 2 data.

Table 6.3-4. Summary Statistics for RC02.

Analyte	Units	# Analyzed	# Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
					Minimum ^a	Maximum ^a	Mean	Median ^b	95th ^b	Minimum (full DL) ^a	Maximum (full DL) ^a	Mean (half DL)	Median (half DL) ^b	95th (half DL) ^b
Grain Size														
Fines	percent	10	10	100	26.6 T	79.6 T	57	61.7	77.7	26.6 T	79.6 T	57	61.7	77.7
Conventionals														
Total organic carbon	percent	10	10	100	0.5	2.9	1.77	1.82	2.68	0.5	2.9	1.77	1.82	2.68
Metals														
Arsenic	mg/kg	10	10	100	3.12	5.68	4.32	4.5	5.32	3.12	5.68	4.32	4.5	5.32
Cadmium	mg/kg	10	10	100	0.14	0.26	0.21	0.23	0.26	0.14	0.26	0.21	0.23	0.26
Chromium	mg/kg	10	10	100	29.2	41	34.8	35.1	40.8	29.2	41	34.8	35.1	40.8
Copper	mg/kg	10	10	100	26.8 T	59.3	39.6	35.6	58.7	26.8 T	59.3	39.6	35.6	58.7
Lead	mg/kg	10	10	100	8.48	17	13.2	14.1	16.6	8.48	17	13.2	14.1	16.6
Mercury	mg/kg	10	10	100	0.028	0.107 J	0.0661	0.059	0.103	0.028	0.107 J	0.0661	0.059	0.103
Nickel	mg/kg	10	10	100	19.7 J	33.5	27.9	28.2	31.7	19.7 J	33.5	27.9	28.2	31.7
Zinc	mg/kg	10	10	100	70.1	106	87.1	86.6	103	70.1	106	87.1	86.6	103
PCB Aroclors														
Aroclors	µg/kg	10	7	70	12 JT	22 T	17.1	17	21.7	2.5 UT	22 T	12.4	15	21.6
Pesticides														
Aldrin	µg/kg	10	0	0						0.22 U	0.41 U	0.138	0.13	0.183
Dieldrin	µg/kg	10	0	0						0.42 U	0.6 U	0.255	0.253	0.291
gamma-Hexachlorocyclohexane (Lindane)	µg/kg	10	0	0						0.22 U	1.7 U	0.22	0.138	0.598
Total chlordanes	µg/kg	10	9	90	0.18 JT	0.76 JT	0.499	0.5	0.748	0.18 JT	0.76 JT	0.476	0.475	0.747
Total DDD	µg/kg	10	10	100	0.25 JT	2.8 JT	0.988	0.73	2.4	0.25 JT	2.8 JT	0.988	0.73	2.4
Total DDx	µg/kg	10	10	100	1 JT	6.9 JT	3.89	4.05	6.27	1 JT	6.9 JT	3.89	4.05	6.27
Total DDE	µg/kg	10	10	100	0.49 JT	2.2 JT	1.37	1.45	2.11	0.49 JT	2.2 JT	1.37	1.45	2.11
Total DDT	µg/kg	10	10	100	0.29 JT	2.6 JT	1.55	1.65	2.51	0.29 JT	2.6 JT	1.55	1.65	2.51
Polycyclic Aromatic Hydrocarbons														
Benzo(a)pyrene	µg/kg	10	10	100	6.4	25	14.3	11.5	23.2	6.4	25	14.3	11.5	23.2
Total HPAHs	µg/kg	10	10	100	73 JT	370 T	184	120	348	73 JT	370 T	184	120	348
Total LPAHs	µg/kg	10	10	100	13 JT	140 T	51.3	31.5	122	13 JT	140 T	51.3	31.5	122
Naphthalene	µg/kg	10	4	40	11	16	12.8	12	15.4	0.58 U	16	5.31	0.398	14.2
Phenanthrene	µg/kg	10	10	100	8	81	28.8	19.5	69.3	8	81	28.8	19.5	69.3
Total cPAHs	µg/kg	10	10	100	39 JT	150 T	85.3	63	150	39 JT	150 T	85.3	63	150
Total PAHs	µg/kg	10	10	100	87 JT	510 T	236	150	465	87 JT	510 T	236	150	465
Phthalates														
Bis(2-ethylhexyl) phthalate	µg/kg	10	10	100	21	330	139	135	299	21	330	139	135	299
Butylbenzyl phthalate	µg/kg	10	1	10	210	210	210	210		2.4 U	210	22.6	1.48	117

Table 6.3-4. Summary Statistics for RC02.

Analyte	Units	# Analyzed	# Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
					Minimum ^a	Maximum ^a	Mean	Median ^b	95th ^b	Minimum (full DL) ^a	Maximum (full DL) ^a	Mean (half DL)	Median (half DL) ^b	95th (half DL) ^b
Semivolatile Organic Compounds														
Hexachlorobenzene	µg/kg	10	0	0						0.12 U	3.9 U	0.498	0.095	1.93
Phenols														
Pentachlorophenol	µg/kg	10	8	80	0.45 J	2.8 J	1.1	0.79	2.31	0.23 U	2.8 J	0.958	0.74	2.17
Petroleum														
Total Petroleum Hydrocarbons (Diesel)	mg/kg	10	10	100	9.2 J	75 J	42.4	44.5	68.3	9.2 J	75 J	42.4	44.5	68.3
Total Petroleum Hydrocarbons (Residual)	mg/kg	10	10	100	73 J	740 J	399	400	655	73 J	740 J	399	400	655
Total Petroleum Hydrocarbons	mg/kg	10	10	100	82 JT	820 JT	443	450	726	82 JT	820 JT	443	450	726
PCDD/Fs														
Total PCDD/Fs	pg/g	10	10	100	32.9 JT	720.4 T	235	75.5	670	32.9 JT	720.4 T	235	75.5	670
TCDD TEQ	pg/g	10	10	100	0.0502 JT	1.85 JT	0.503	0.14	1.59	0.0502 JT	1.85 JT	0.503	0.14	1.59

Notes:

^aWhenever several result values match maximum or minimum value, qualifier and descriptor preference has been given in the following order: U over J over A over N over T over no qualification.

^bMedian is the exact result value ranking as the 0.50 percentile in an ascending list of all results, and 95th percentile is the exact result value of the 0.95 ranking result. When the ascending list of all results doesn't produce an exact match to the corresponding percentile rank, average of two adjacent results ranking closest to 0.50 percentile is the median, and an interpolated value is the 95th percentile. Such median or 95th percentile value is not qualified. It is qualified with "U" if both results ranking immediately above and below the corresponding percentile are "U" qualified, and with "J" if at least one of the results is "J" qualified.

cPAH - carcinogenic polycyclic aromatic hydrocarbon

DDx - total of 2,4' and 4,4'-DDD, -DDE, -DDT

DL - detection limit

HPAH - high molecular weight polycyclic aromatic hydrocarbon

LPAH - low molecular weight polycyclic aromatic hydrocarbon

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

PCDD/F - dioxin/furan

TEQ - toxic equivalent concentration

Reason codes for qualifiers:

J - The associated numerical value is an estimated quantity.

N - Presumptive evidence of presence of material; identification of the compound is not definitive.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Reason codes for descriptors:

A - Total value based on limited number of analytes.

T - The associated numerical value was mathematically derived (e.g., from summing multiple analyte results such as Aroclors, or calculating the average of multiple results for a single analyte). Also indicates all results that are selected for reporting in preference to other available results (e.g., for parameters reported by multiple methods) for the Round 2 data.

Table 6.3-5. Summary Statistics in the Upstream Study Area Depositional Cores.

Location	Total PCBs ^a (µg/kg)					TCDD TEQ (pg/g)					Total DDx (µg/kg)					Total PAHs (µg/kg)					
	# Analyzed	# Detected	Mean	Median ^b	95th ^b	# Analyzed	# Detected	Mean	Median ^b	95th ^b	# Analyzed	# Detected	Mean	Median ^b	95th ^b	# Analyzed	# Detected	Mean	Median ^b	95th ^b	
Study Area Depositional Cores																					
All Upstream Depositional Area Core - Combined	29	10	6.9	3.6	19.8	29	29	0.536	0.175	1.62	29	29	3.86	3.8	6.42	29	29	229	210	434	
RC02 - Borrow Pit @ RM 10.9	10	7	12.4	15	21.6	10	10	0.503	0.14	1.59	10	10	3.89	4.05	6.27	10	10	236	150	465	
RC01 - Borrow Pit @ RM 10.5	9	1	3.41	2.3	na	9	9	0.969	0.387	3.72	9	9	3.03	3.5	5.34	9	9	212	170	422	
RC483 - Shoal @ RM 9.5	10	2	4.51	3.28	11	10	10	0.181	0.103	0.5	10	10	4.59	4.15	8.43	10	10	238	255	270	

Notes:

^a Total PCBs are based on Aroclors, congeners were not analyzed in these cores samples.

^b Median is the exact result value ranking as the 0.50 percentile in an ascending list of all results, and 95th percentile is the exact result value of the 0.95 ranking result. When the ascending list of all results doesn't produce an exact match to the corresponding percentile rank, average of two adjacent results ranking closest to 0.50 percentile is the median, and an interpolated value is the 95th percentile. Such median or 95th percentile value is not qualified. It is qualified with "U" if both results ranking immediately above and below the corresponding percentile are "U" qualified, and with "J" if at least one of the results is "J" qualified.

DDx - total of 2,4' and 4,4'-DDD, -DDE, -DDT

na - not applicable

PAH - polycyclic aromatic hydrocarbon

PCB - polychlorinated biphenyl

RM - river mile

TEQ - toxic equivalent concentration

TOC - total organic carbon

Reason codes for qualifiers:

J - The associated numerical value is an estimated quantity.

N - Presumptive evidence of presence of material; identification of the compound is not definitive.

U - The material was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit.

Reason codes for descriptors:

A - Total value based on limited number of analytes.

T - The associated numerical value was mathematically derived (e.g., from summing multiple analyte results such as Aroclors, or calculating the average of multiple results for a single analyte). Also indicates all results that are selected for reporting in preference to other available results (e.g., for parameters reported by multiple methods) for the Round 2 data.